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ABSTRACT

This study was undertaken to determine the nature of innovation, change, and reform in higher education institutions, and to suggest how the use of educational technology might be made more effective in contributing to achievement of educational objectives. Visits were made to over 100 institutions in which externally-funded experiments were being attempted to solve different kinds of problems. Information from these visits revealed patterns of elements and conditions that distinguish successful from unsuccessful innovations. In general, innovations and changes will not be attempted or adopted just because materials are available and a need can be demonstrated. Practices and processes in collegiate institutions have grown up over time and tend to persevere unless certain favorable conditions are present and specific techniques are used to encourage innovation and change. (CH)

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How Colleges Change:
Approaches to Academic Reform

Lewis B. Mayhew

July 1976

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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INTRODUCTION

This paper summarizes the results of a study undertaken to determine the nature of innovation, change and reform in higher education institutions and to suggest how the use of educational technology through such services as libraries, media centers, and computers might be made more effective in contributing to achievement of educational objectives. The study was conducted through visits to over 100 institutions in which externally-funded experiments were being attempted to resolve many different kinds of problems--from the creation of new management information systems to improvements in lecturing in professional school courses. Each visit entailed reading the proposal or prospectus for the project, discussing its progress with those involved, examining relevant documents and products, and, whenever possible, obtaining evidence as to effect or impact. As the information from these visits accumulated, patterns of elements and conditions emerged that distinguished seemingly successful from seemingly unsuccessful innovations, as judged by the author. I have attempted in this paper to identify those patterns and conditions under which innovations in higher education succeed and become adopted. While some ideas presented here are already supported in the literature, there are several new concepts advanced such as the power of oligarchies to affect innovation, and the parallel opposition of student and faculty groups to innovative practices. Support for this undertaking was provided by the Exxon Education Foundation.

SECTION 1. THE PARADOX

Formal collegiate education as it is practiced is in essence a simple process. It consists of a professor telling students something, asking questions, assigning readings (generally from a textbook), asking them to accomplish certain tasks as, for example, laboratory exercises, or asking them to observe certain things such as geologic phenomena during a field trip. Students also give each other information and work in groups on either assigned tasks or tasks they generate which presumably contribute to their growth and development.

These simple processes can be embellished, presumably improved, and made more sophisticated and effective. The substance of a textbook can be augmented through extensive use of other reading material. The sometimes random and extemporaneous questioning can be refined through workbooks and syllabi that lead students through tightly constructed sequences of questions and problems. The full meaning of a professor's description of some phenomenon may be more clearly exposed through visual displays, slides and films. Amounts of learning can be measured by carefully constructed tests administered with the aid of a computer that can provide students with instant knowledge of their successes or failures, and this presumably helps their intellectual development. Amplified telephone conversations can allow students to discuss issues with knowledgeable individuals located far from the college campus.

Through use of tapes and videotapes professorial presentations can be used and reused by students seeking to derive the most meaning from those statements. Entire college courses can be made portable through videotape recording of lecture sequences, preparation of accompanying workbooks and tests, and distribution of the taped lecture materials via open-circuit television. Simulations of laboratory experiments generated by computers can enable students to practice needed skills off campus. Even the most simple processes of teaching can be changed and presumably improved by learning specialists who can help professors improve their lecture skills and techniques of conducting discussions.

One problem is that use of these additional elements in formal education typically requires greater expenditure of time and energy and the acquisition of new skills, than in the practice of traditional collegiate education in its essential form. Selection and assignment of a single textbook is less time-consuming than developing extensive and continuously revised bibliographies of relevant material in libraries. Preparing lecture notes and delivering a lecture are for the most part easier for an experienced professor than creating a sequenced course of well-developed modules that present students with a variety of experiences, including instant awareness of whether or not a particular concept

has been mastered. Preparing films and slides requires skill, time, and effort, as does designing a programmed computer game that students can play individually or as members of a group. Professors who might enrich their teaching by using some of the many resources available must be convinced that to do so would be worth the additional expenditure of time and the effort needed to acquire new skills. Thus exponents of extended uses of libraries, technological adjuncts to instruction, or services to help professors improve must really merchandise their products or services and persuade faculty members of their worth. And they must be provided with persuasive evidence that the embellishment of simple teaching makes some significant differences in outcomes.

The need to do so may be illustrated by looking at several Utopian views of education using extra resources with education as it typically is practiced:

> ***** One vision is of a fully automated college campus attractively designed but having only a few traditional classrooms. Students come to the campus the first of the week and participate in a group meeting designed to outline the week's activities and to motivate students to enjoy the richness the college possesses. The individual students then go to their own carrels, each of which is equipped with a tape recorder, a television monitor, a small computer console, and a light pen capable of activating certain computer responses which are then displayed on the television screen. Students will read a problem in the workbook, ask the computer to retrieve needed information from the library, assimilate that information when it has been received, and then activate a library of stored examination questions to display tests which will determine whether or not students may proceed to the next unit. If it were a course in history, students could signal the library to display slides of reproductions of pictures. Or, if the course were in genetics students could ask the computer to conduct a simulation exercise showing generational mutations of fruit flies. When students encounter a problem requiring practice of skills, as for example, laboratory skills, they move from the carrel to another room containing individual and specifically prepared laboratory experiments which they conduct. They then return to the carrels to test their actual achievement. In a musicology course, students can go to another room where a hologram display of archaic musical instruments is shown in three dimensions. Students can examine those displays at their leisure, taking notes and returning once again to the haven of the carrels. Or students can work as a group by going to still a different location, gathering around the console of a computer and play a simulated game designed to develop understanding of problems of air pollution. At the end of the day students may wish to work further on some matter and check out several videotape cassettes to take home with them to play over the television set in their own homes. Throughout the day faculty members are available in their own offices or near the carrels to be of help to individual students. When not working with students, professors spend their time creating new materials and organizing new sequences of problems to keep the courses up-to-date. They are aided in such activities by television producers, technical experts and learning specialists who can help the professor decide on the optimum organization of materials.
>
> ***** A variant on that vision shows a library as the central element in the campus complex. It contains not only books and printed materials, but art galleries, collections of slides and films, and collections of audio and videotape recordings as well as computerized access to libraries all over the world. It also contains many varying sized rooms where students can work individually or in groups with the treasures of the library. The augmented library staff works closely with professors to organize courses requiring maximum use of library materials, and is

constantly alert to extend the variety and richness of what is available. Faculty offices are located near the library and professors spend their time counseling students or developing new courses which will ensure that students are exposed to the most up-to-date information on any given subject.

***** Still another vision is of adults engaging in lifelong learning. Through the mail they obtain full courses consisting of videotape cassettes of lectures, packages of miniaturized laboratory equipment, attractively programmed reading materials, and tests they can take at their own convenience. Their daily newspaper contains printed lectures for another course for which they are supplied syllabi, books of readings and reproductions of relevant materials. As adult learners undertake substantial research projects they visit a branch office of the local community college where there are counselors, basic reference materials, and computer terminals linked to a network of bibliographic data bases. Using carefully developed lists of words describing the matter being considered, students obtain from the computer annotated bibliographies of the most recent information. After scanning computer-prepared printouts, students select those they wish to examine more fully, go to a bank of file cabinets, and select microfiche reproductions of the full document that they can examine on one of the many microfiche readers available in the center. Returning home, students find letters informing them of the programs on educational television that will be presented that week and that are relevant to the courses they are studying. Accompanying those notifications are other computer-printed documents containing appraisals of recently completed examinations and indications of what specific things the students should do to rectify deficiencies. Among other assignments, the computer informs adult students that there is to be a particularly relevant lecture that week on the college campus that they should attend.

The essential technical elements in these scenarios can be quickly summarized (Knirk and Childs 1968, pp. 21-22).

1. Centralized tape libraries from which local school systems could select an entire course of instruction or specialized lectures prepared by the best teachers in specific fields.
2. Closed-circuit TV systems for a school district or region and individual tape players--the hear and see devices--to enable each classroom to utilize the course materials that can be made available to every school.
3. Electronic teaching machines that have been particularly successful in language instruction.
4. Programmed learning systems for detailed repetitive instruction.
5. Scanning devices in each classroom that would be linked to the library and records offices to free teachers from many routine functions.
6. Computer centers for grading examinations for a school or an entire school district, relieving teachers of a time-consuming chore.
7. Computers for cataloging and retrieving information.
8. A flexible open-circuit educational TV network to bring a variety of current events type instruction to classrooms.

A look at how collegiate education is actually practiced suggests the magnitude of changes in educational behavior that must take place before such Utopian visions might be realized. Lectures and group discussion involving a single teacher and a group of students is the prevailing mode. Textbooks continue to represent the major means of transmitting information, and undergraduate libraries still seem to be used more as study

halls than as avenues to massive collections of books, other printed materials, collections of slides, and the like. One can still walk down the corridors of almost any undergraduate academic classroom building in the country and see no instructional television, no interactive computers, no slides and films, and no multi-media classrooms. Generally, there will be a language laboratory, typically underused, and there may be places on campus enabling students to undertake bibliographic searches. However, the impression persists that the lives of most undergraduate students remain substantively untouched by the varied resources that are available. This is not to say that attempts are not being made to use new approaches to formal education. Indeed, with the federal and foundation support, there is a great deal of experimentation. Centers and laboratories are constantly experimenting with new materials, and individual faculty members will try out some new approaches. However, few experiments or attempted innovations, even though successfully conducted, become part of the mainstream of educational practice.

Thus is exposed an amazing paradox. Substantial volume of educationally relevant materials and technology has emerged. Libraries have changed from simple repositories of books to sophisticated centers with many different methods of delivering information and the capability to retrieve information from all over the world. Communications technology brings events taking place throughout the world instantly into classrooms. Photographic and reproductive equipment brings richness and detail to the attention of students that would be inconceivable through the more traditional forms of lecturing, demonstrations, or even laboratory experiences. Relatively inexpensive computers store enough information so that entire courses can be taught without interfering with computer capacity needed for administrative or larger research efforts. Networks of computers allow students in one part of the country to interact with programmed data bases located in other parts of the country in order to develop basic skills of language or number.

Experimentation typically has shown that these newer techniques are educationally sound, as determined by performance on tests of cognitive skills and knowledge. Lectures over television produce gains in knowledge as does the more traditional face-to-face lecture, and if large enough numbers are involved, TV lectures can produce those changes more efficiently and economically. A well-prepared filmstrip can teach specific skills better than a longer and more expensive demonstration by a professor. Computer-based games can generate student enthusiasm and develop skills and knowledge that last longer than could be achieved through more traditional ways of teaching. Carefully prepared programmed texts can produce greater gains than lectures and demonstrations, when similar amounts of time are spent with each.

But while resources are available and the educational values of these can be demonstrated, they still do not play a central role in collegiate education. This paper has been prepared to examine how to resolve this paradox. It is assumed that greater and more varied uses of libraries and sources of information really represent innovations for most college faculty members. It also assumes the innovative quality for much of available educational technology, and that use of them might improve the quality of education. This being so, it is assumed that a greater understanding of how innovations and changes in education are attempted could be useful to produce greater and more sustained acceptance of educational, informational, and communications resources in colleges and universities with attendant educational gains.

An underlying premise of this paper is that innovations and changes will not be attempted or adopted just because materials are available and a need can be demonstrated. Practices and processes in collegiate institutions have grown up over time and tend to persevere unless certain favorable conditions are present and specific techniques are used to encourage innovations and change. The following sections examine techniques and strategies that can help administrators encourage experimentation with educational resources which might make formal collegiate education more effective. While many of the examples involve innovations based on uses of technology, other kinds of innovations also are discussed in the belief that the conditions, tactics and strategies necessary to encourage innovation are substantially the same, regardless of the kind of innovation being attempted. For example, it is premised that encouraging an undergraduate faculty to make greater use of an Educational Resources Information Center (ERIC) microfiche collection requires the same sorts of conditions and tactics as to produce a new interdisciplinary course. Similarly, whether or not a computer-based course in political science using simulated games is adopted and used depends on the same sorts of factors

that determine whether or not a computer-based management information system is adopted and used by the central administration of a college or university. This point may be debated but it is argued here that administrative officers such as registrars are as reluctant to change routines as are professors.

SECTION 2. CONDITIONS FOR SUCCESS

In 1971 Patrick J. Ford and I advanced some principles in anticipation of developing a generalized theory of engineering or contriving desirable change. We argued the need for a vigorous, strong, and occasionally ruthless administrative power on the ground that faculties were essentially conservative and that without vigorous administrative leadership, institutions would become lethargic and even moribund. However, we recognized that an overly strong administration in the presence of a weak faculty could result in too much change just as a weak administration in the presence of a strong faculty would result in stagnation. An ideal would be a structure that could hold a strong administration and a strong faculty in a position of creative tension. Both the formal and informal structures would reflect that creative tension out of which optimum change and innovation could take place. Secondly, we urged appeals to the self-interest of those being encouraged to change through such benefits as financial incentives, free time, or increased status. We had come to believe that in the absence of some kinds of incentives, change--particularly in curriculum or teaching practice--was unlikely. Preparing an effective televised lesson requires greater effort than delivering a lecture based on notes, and typically that effort must be rewarded in some way. We also sensed the need for an innovator who could come from almost any part of an institution or even from outside. We felt that a reasonably aggressive person could become a leader for change, particularly if he or she saw an opportunity for a new and more interesting and rewarding role.

We also stressed that innovation, change, reform or improvement requires time and that an institution must so acknowledge, either through paying for extra time or redeploying individuals so that time can be devoted to the desired changes. On the assumption that appeals to reason would be especially compelling if economic elements were made clear, we argued that institutions should develop refined systems of cost accounting so that the true costs of older ways of teaching or organizing the curriculum could be indicated. If instructors could be shown the high costs to themselves personally of such activities as small inefficient courses taught by lecture techniques, they would more readily consider change. Lastly, we felt that faculty members, because of the kinds of people they are, are frequently threatened and insecure individuals who are likely to react defensively to change and innovation. To the uninitiated, a computer keyboard can and does create fright. Thus, whoever seeks to contrive change must be aware of the threats implicit in change and also be able to employ directives for protection (Mayhew and Ford 1971, pp. 126-128).

A number of writers have stressed the role of leadership in producing change. Levine and Weingart (1973) argued that if an institution prepared a well-developed philosophy of education, then capable administrators having power, resources, and the ability to use techniques of personnel management could produce desired changes. Greeley (1968) inclined in the same direction with his finding that in Catholic colleges, whether an institution improved or remained static depended chiefly on the professional (managerial) competence of the administrative leadership. Hefferlin (1969) also assigned leadership a significant role, while at the same time recognizing other conditions of change such as the rate of external social change and an attendant organizational instability. However, he noted that leadership would be more likely to succeed if it were avuncular in style rather than authoritarian or laissez-faire. Authoritarian leadership is somewhat paternalistic; laissez-faire is neutral; while avuncular is more like a kindly uncle. The avuncular president is concerned, supportive, and encouraging of new ideas, but in the final analysis he or she assumes individuals will do what they believe best for themselves. Watson also acknowledged that changes affecting the entire institution were usually

initiated and carried out by top administrators (Baskin et al. 1967). However, he believed that the wise administrator would typically seek temporary change first on the ground that that would be less threatening. Eventually, if the change proved of worth, it would become permanent.

An important element of leadership is sensing the right time to introduce innovation. For example, sophisticated equipment at Florida Atlantic University was not used largely because it was introduced as people were preoccupied with starting a new institution. Leaders may see clearly that there is a serious external threat that requires a major change. But if the internal conditions are not ripe, the change will not take place. Another example can be found in many institutions during the late 1960s when presidents saw that an end to higher education affluence was coming. But needed fiscal reforms could not be introduced because faculties and students who had gained a great deal of power during the decade were still under the illusion that expansion could continue forever. It was only when the serious financial plight became widely recognized, as in the exhaustion of financial reserves, that leadership could make significant changes to bring about a balanced budget.

Further, and even more importantly, leadership cannot compensate for lack of technical competency within an institution. This may seem like such an obvious matter as to appear almost trivial. Yet time and again new, sound ideas and recommendations are made by responsible leaders or policy-making groups, only to fail because the needed technical skills were not present and that fact was overlooked. The various national policy groups, for example, have stressed the need for better testing and counseling. Yet those suggestions have not been followed largely because of the lack of people in institutions skilled in the use and construction of tests and the lack of finances to support a workable program.

Leadership is one of the central essential conditions for change and it must be exercised in a definite and predictable context. A strong president in a weak, invisible college isolated from other comparable institutions is impotent. Avuncular leadership in the presence of an antagonistic oligarchy will be similarly impotent. Nor can kindly, inspired, or strong leadership transcend the needed technology. Demands for better, more available and appropriately correlated information, for example, could not be met until relatively inexpensive computers were perfected.

Other theorists besides the author have emphasized other essentials for innovation and change. Evans related acceptance or rejection of educational television to the proportion of innovative types of people on a campus (Evans and Leppmann 1967). Each institution seems to have some individuals who are willing to try almost any new idea and others who tend to be against anything new. This phenomenon is easy to illustrate, as in the case of the professor retiring after forty years of service who remarked that during those years he had seen many changes and had been against all of them. In addition, too large a concentration of resisters is an effective barrier to change. But as some examples will subsequently show, a well contrived major innnovation can be accepted by even the skeptical if there is a pay-off.

Size of the institution figures in both the folklore of higher education and in serious research about change. It is frequently contended that the truly innovative institutions are usually the small, private institutions in which people are free to experiment. However, Hodgkinson (1971) finds it otherwise. The major element in institutional change is size, with the larger institutions having more of everything--resources, trouble, richness of program, and invention of innovations. This analysis provides no definite evidence on the effect simply of size except indirectly. What does appear significant are available resources and something called capacity, which means the overall strength of an institution. To the extent that resources and capacity (strength) are related to size, then size is a factor. Institutions without available or slack resources are not likely to try innovations, or if they do try, are likely to fail. Starting or implementing almost any significant innovation requires money, whether it be a better advising system, a computer-based course in genetics, a new testing program, or use of cases in a program of educational administration.

Very strong institutions seem unwilling to change, especially in curriculum and instructional areas because of the difficulty in reaching consensus. Very weak

institutions also tend to remain static until, in the years just before they die, they exhibit a frenzy of futile activity. The most fertile soil for change appear to be those institutions in the middle.

Consistent with much of the previously cited literature, but also differing in some regards, the present study is based on intensive site visits and in-depth interviews with people involved in attempted innovations, and draws on some of the relevant literature dealing with innovations in educational and noneducational organizations. The results of the study suggest a pattern of factors involved in producing innovations and change--a blueprint or design. In aggregate, such a design, if thoughtfully implemented, could make institutions of higher education considerably more responsive to changes in society than they presently are. The findings of the study suggest that optimum conditions for innovation, whether using a computer-based management system or a computer network, would involve a college or university very likely stimulated by external conditions (frequently, but not always, threatening conditions) and presided over by a chief executive who is interested in change and willing to use the full resources of his position to stimulate it. The chief executive would select as an effective change agent a faculty member of stature and security who is somewhat marginal with respect to the interests and activities of his or her own group: for example, a history professor who is intrigued with psychiatrics more than with orthodox history. This individual, sensing needed changes, would assure himself or herself of the availability of appropriate technology and of individuals possessing the technical skills and interests to work with whatever is proposed. Ideally he or she would develop those technological skills. While developing the plan for change this individual would seek to include elements of advantage for all constituencies likely to be involved and also would seek legitimacy from presidential and oligarchic support. The innovator would be assured of reasonable and adequate funding that would allow the purchase of time to plan and, in the event it was necessary, the purchase of the interest and loyalty of colleagues whose support or service is needed. Once the planning is completed and the innovation or change made operational, the innovator would very likely seek for himself a continuing position of responsibility with respect to the change so that he or she could fulfill some psychological, personal, and professional needs. To some, these may seem highly subjective and questionable criteria for a change agent. Yet invariably they have been the significant elements involved in the successful innovations examined as a basis for this monograph.

This general pattern seems to apply whether changes are attempted for a small sub-unit such as a department or for a total complex institution. Of course, small changes of little consequence are easier to make than large ones, although frequently what appear to be small changes can assume the properties of large ones and thus become more difficult to achieve. One perplexing matter which has bothered a number of readers of this monograph as it was being prepared is the lack of definition of a good innovation. Cost-benefit criteria could be used, but is too narrow. Educational gains could also be used, but in general evidence seems to suggest that most new methods of teaching or new curricula produce modest or no significant differences as compared with traditional methods as established by cognitive tests. Conventional professional wisdom is also a possibility (although it changes as fads come and go), as is student or teacher satisfaction. Rather than employ these, or other similar criteria, the goodness of an innovation in this monograph will be relative. Is it consistent with an institution's traditions and mission? Does it appear to approximate generally accepted standards of excellence? For example, an innovative doctoral program which could be completed typically in one year of part-time work would fail. Are its costs such that it can be supported by an institution's budget without seriously dislocating other core activities? Does it attract student and faculty interest and produce reasonable satisfaction? Does it appear likely to become institutionalized?

I have drawn a number of illustrative examples from this study in support of the general pattern contributing to successful innovation. They are grouped under the following:

Administrative Leadership
Available Needed Technology
Technical Competence
Institutional Readiness
Consistency with Institutional Traditions
Rewards for Users
Personal Involvement of Innovator
Prevailing Oligarchy
Adequate Funding

ADMINISTRATIVE LEADERSHIP

The evidence from the cases studied suggests that strong administrative support by the executive hierarchy of the college or university is the most important condition necessary for innovation and change in American higher education. The phrase executive hierarchy is used deliberately to include the dean, director, and/or department head of a unit in which significant innovation is being attempted. There also must be support and encouragement from still higher administrative levels. Because of the tradition of administration in American higher education and because of the broader perspective that chief administrators bring to a consideration of institutional purpose and functioning, the president occupies a unique position with respect to innovation, change and reform. There have been few significant innovations in American higher education that were not presidentially supported, and more recent innovative attempts reveal the same tendency. Because of the way institutional financial resources are deployed and budgeted, it is true that administrative officers have relatively small amounts of discretionary funds. And it is also true that given the ways responsibilities are allocated (with the faculty responsible for the curriculum), administrative intervention in many activities of an institution is difficult. Such facts have led some theorists to speculate that the administrative role is relatively impotent in bringing about successful change. Despite limitations on administration prerogative, the presidency still remains the most powerful position on the campus (Cohen and March 1974). And unless that power or influence is exercised to produce or support innovations and changes, the latent organizational conservatism of other constituencies, notably the faculty, will prevent the generation of new ideas and their implementation.

The role of administrative leadership is seen clearly in several examples. First is that of Antioch College which, though it prides itself on a highly democratic system of governance, nonetheless requires strong administrative leadership to remain viable. In the late 1960s its president promoted a new approach to the freshman-year program. Essentially, a new curriculum changed completely the way students' programs were developed in the freshman year. There would be a great deal of independent study and considerable use of the library and audiovisual materials especially selected to facilitate individual learning. The entire freshman year was seen as consisting of five stages. First was to be a two-week period of diagnosis, evaluation, and planning conducted jointly by students and their faculty advisors. Then followed a ten-week period when students would use on-campus resources, a thirteen-week off-campus period (cooperative work-study), ten weeks of on-campus learning, and at the end of the year, a one-week period for final evaluation and planning for subsequent work.

This new program posed a number of threats for faculty. Some were uneasy because of the lack of structure, the relaxation of virtually all requirements, and the elimination of grades. Others were uncomfortable when their role as a classroom teacher changed and they became mere resources to be used at the discretion of students. Some faculty were uneasy with the role of preceptor (or advisor), feeling that they were incapable of dealing with many of the psychological needs of students.

This particular example presents two fundamental issues regarding innovation. The first is the appropriate role of faculty, students, and administration. A number of the more academic faculty members came to believe that they had no voice in educational policy

at the institution and that initiative and decisions came largely from central administration with the support of students. They believed that the freshman-year program was diluting academic standards and could jeopardize the college's reputation. However, faculty members also recognized that if administration did not exert positive leadership, profound change very likely would not take place. It seemed to many of them that radical innovations would not happen unless strong and talented administrative leadership were present and exercised. And radical change seemed called for if Antioch was to survive the increased competition of the 1970s. Twice before the institution had surmounted financial crises by making radical changes. It appeared that a third crisis was in the making. Actually the college adopted an even more radical device--creating an 18-campus system--but at that time there was general agreement that radical change of some sort was essential.

A second issue concerns the speed with which the innovation was attempted. Some faculty members thought that if greater time been provided to orient faculty members to such a wide-ranging reform the result might have been better. On the other hand, some admitted that if extensive time been spent on faculty discussions quite possibly the whole concept would have been diluted.

Another example of the role of administrative leadership is the creation of a required multi-media-programmed course in engineering at Oklahoma State University. At the time both the president and academic vice-president of Oklahoma State University were firm believers in educational innovation and were willing to use institutional resources to help faculty members experiment. One of these experiments produced a two-semester course equally appropriate for mechanical and electrical engineering students that was largely self-taught. One of several forces involved in producing this effort was a department head in mechanical engineering who was very much concerned with educational innovation and the need to make engineering education more reality-oriented. Another force was considerable ongoing experimentation with pre-professional, individually prescribed instruction. Behind those local factors, of course, was the existence of educational ferment within schools and colleges of engineering as they sought to stem declining enrollments and to bring the engineering curricula more closely in line with the realities of engineering practice.

This example illustrates the impact made by a highly innovative individual occupying a powerful position in the institution who has the resources to encourage exploration of ideas. A second facet of this case is instructive in another way. On the same campus but in a different college, and as a result of some of the same forces, an attempt was made to develop a self-paced course in critical thinking. In that college, however, the dean, associate dean, and department head were persuaded that for the most part, traditional modes of instruction were more cost-effective than newer modes. They tolerated the experiment, partly because it was supported by a grant, but insisted that the project director quickly return to his orthodox duties. The failure of this undertaking was predictable from the start, if our theory is valid.

AVAILABLE NEEDED TECHNOLOGY

A second necessary condition for successful innovation is the availability of reasonably priced necessary technology which performs well enough to be used regularly. An example of this was the development of on-line computer instruction in finance in the Graduate School of Management at Northwestern University. The problem lay in the inadequacy of using a blackboard to illustrate complex problems and the slowness of using the computer in batch mode processing. The blackboard did not allow students to participate in problem solving and to see immediately consequences of various decisions. Students could work out problems on computers, yet the time lag of several days before printouts could be obtained proved to be educationally unappealing. The availability of adequate computer capacity during certain parts of the day for on-line interaction between individuals and the computer and the availability of television monitors to display problem illustrations provided the essential equipment, and the prices were within institutional resources. Had the attempt been made three years earlier it very well might have failed because Northwestern could not have obtained the needed technology. With the technology available, the process of developing needed software was relatively

straightforward. Within a year, several financial problem cases were stored in the computer together with a reasonably complex data base, so that a lecturer in finance could develop alternative solutions to complicated finance problems during the course of the lecture.

This example is also significant with respect to the processes of innovation. It represented no particular theoretical advance in the uses of computers. Rather it represented a refinement of the long-used lecture with some problem-solving presented in the context of the lecture. One can speculate that technology and innovations that allow professors to simply do better what they are long accustomed to doing will have a reasonable chance of success.

Another example of use of available technology, mixed with respect to success and failure, was an attempt to use a computer-based file retrieval and editing system as a basic part of teaching a collegiate interdisciplinary course. The sophisticated computer-assisted text editing and information system designed at Brown University was intended to give maximum mechanical assistance to all phases of document preparation. The equipment consists of a data bank on a given subject, a display panel connected to the computer data bank which can allow several columns of information to be displayed simultaneously, a console, and a light pen that allows the user to indicate which items need further information. The computer immediately produces the desired information from the data bank and displays it. After 3,000 pages of course information were stored in the computer, the experimental course was offered to 14 students in the spring term of 1974. During the course students would sit at a console and retrieve and study materials designated by a course syllabus. Generally students would spend about an hour at each sitting before the console, looking at a hundred or more discrete pieces of information. An important part of the course was a term paper, which the students could compose on the computer. A student might type in a generalization and then retrieve from the computer necessary footnotes or supporting data that would be recorded into the text.

It is difficult to predict how widely or quickly this innovation will be adopted by others. And it is equally doubtful whether the course will be continued at Brown because the professor who taught it had no particular professional stake in its continuation. The computer storage of information is expensive and the course did require considerable supervision. However, the point here is that sheer availability of a particular technology stimulated an inquiry as to whether or not there were educational implications.

TECHNICAL COMPETENCE

Of equal importance as a condition for successful innovation is whether or not individuals involved possess the technical skills to operate the change. Virtually all categories of educational innovation and change require technical skills on the part of users. A computer-based management information system requires understanding of computers, the nature of available data, the source of other potentially useful data, as well as the range of plausible hypothetical questions that, when answered, can help in reaching decisions. Very likely, optimum use of television as a self-contained mode of instruction requires more technical skills than can reasonably be acquired by a single individual. For example, the British Open University program uses teams of academicians, educational programmers and television specialists in order to extract optimum benefit. An educational program using a small group of students and faculty deeply immersed in a subject over a period of time requires technical understanding of group dynamics and skills of resolving group problems not ordinarily possessed by college or university professors. But even in more traditional sorts of changes, the possession of technological skills is equally central. If educational testing comprises an important part of an innovation it should be recalled that the preparation of adequately valid and reliable test questions requires a great deal of skill and experience. Developing programmed materials which realistically anticipate the kinds of questions students will ask and perplexities they will experience require not only considerable experience in working with students, but the technical skills of phrasing stimuli so as to elicit appropriate student responses.

The essential point need not be long belabored, but perhaps it can be sharply focused through two brief examples. At Knox College a dean of students developed a computer program and associated workbooks for a course on principles of accounting. He had decided

to return to teaching and Knox College provided him with a leave of absence to prepare himself for that return. He spent the full year becoming thoroughly familiar with computerization and the potentiality of the computer for instruction. His interest was in part motivated and facilitated by the fact that the college had installed a rather complex computer system as part of its effort to remain viable as a privately supported liberal arts college. In addition, the college had a twenty-year history of being highly innovative under the leadership of a president constantly questing for ways to insure the continuing existence and effectiveness of his institution. The professor thus was willing to make himself technically competent before undertaking the development of this course, and he was aided in doing so by not being distracted by other activities. Although he used students for some parts of the work, they were always under his direct supervision and he himself did all tasks requiring technical skills.

This experiment was in sharp contrast to an attempt of another institution to develop a cluster of six cases to be used in an engineering course in design. The attempt proved abortive for several reasons. The work of putting together case materials that are pedagogically sound seems to require skills and experience beyond that possessed by most graduate research assistants. Yet the undertaking relied on graduate students to visit an industrial location, sense the critical elements of a case and then put these elements together so as to lead student thought processes. Graduate students given this assignment would spend many weeks fumbling to discover the proper way to develop case materials. Additionally, these cases were to be enlivened through various audiovisual materials. However, the photography and sound reproduction were prepared by graduate students without training which resulted in decidedly amateurish films and tapes far from the quality needed to interest others in adopting that particular version of case study.

INSTITUTIONAL READINESS

Reviewing institutional histories, one is struck by the fact that a suggestion for change made at one time makes no impression whatsoever, whereas just a short time later the suggestion is accepted, modified appropriately, and adopted into the institutional fabric. The point can be dramatically made by considering the efforts of predominantly white institutions to recruit black students and to make specific financial, social, counseling, and curricular provisions for their unique needs. During the early part of the 1960s predominantly white institutions in the North, while willing to accept qualified black students, made no particular effort to recruit them or to even admit that institutions might have a responsibility to accept academic risk students and make provisions for them. It was not that the idea of assisting such students had not been thought of or presented. It was just that such institutions were not ready to face up to their responsibility. This changed almost overnight following the death of Martin Luther King, Jr. Suddenly institutions became receptive to accepting students who did not meet traditional admissions standards and it became highly acceptable to redeploy institutional resources to provide financial assistance to black students (Mayhew 1968).

The same phenomenon of change in level of institutional readiness for particular kinds of innovations can be found during other less stressful times. For example, in the Graduate School of Business Administration at Tulane University the faculty undertook a major curricular planning effort during a summer and subsequently adopted individualized instruction and modularization of the curriculum, whereas several years previously such techniques would have been regarded by the faculty as anathema. The whole climate of the school had undergone profound change, largely through the initiative of a new dean who, taking advantage of a number of retirements, recruited an almost entirely new faculty of relatively young scholars who, while research-oriented, were still concerned with teaching. That faculty found such new devices as individualized instruction and modularization attractive in part because such devices could help the school conform to a new university policy which required each professional school to become financially independent. The dean and his young faculty believed that the school could operate on its own resources if it could find ways of maintaining a constant number of faculty members while accepting a growing number of students. To do this would mean finding new and more efficient ways of curricular building.

The components of institutional readiness for change are little understood, and there are no indicators that might suggest that an institution or unit is ready to accept change. However, it seems clear that readiness to accept innovation frequently develops

as a result of suddenly perceived threats to institutional stability or viability. Private liberal arts colleges have adopted radically new curricula when the competitive pressures of lower-cost publicly-supported institutions became sufficiently acute to threaten their enrollments. A number of schools of engineering have adopted new freshmen-year courses with heavy components of reality when a steady decline in enrollments reached critical proportions. Private liberal arts colleges have experimented with management information systems and simulation planning when several years of deficit spending suggested that institutions actually could go bankrupt unless the fiscal picture improved. Again, some liberal arts colleges radically changed their counseling and advising systems when it became apparent that continued high attrition of students during the first year of college threatened the continued existence of the institution.

Earl Cheit (1973) generalizes such a phenomenon in discussing 41 institutions' responses to existing or approaching financial difficulty. He says that:

> ...Whatever the validity of the charge that neither exhortation, rebellion, nor a new outside world can make colleges and universities change, it is now clear that a shortage of money can. The forty-one schools in the study are changing. The changes are occurring in response to the pressures of difficult financial circumstances....In most of the forty-one institutions...there developed new managerial practices and organizational relationships. Their short-run consequence has been a sharp reduction in the rate of growth of the institution's expenditure. Although the need to cut expenditures motivated the development of these new managerial practices and organizational relationships, their influence extends well beyond questions of money. Questions of money eventually lead to questions of purpose and these new managerial practices and organizational relationships form the evolving system by which the schools are making the transition from money questions to purpose questions. The additional consequence of these new practices and relationships, therefore, is the development of new administrative and faculty standards of judgment about educational quality and purpose. In two years this process has moved fast enough so that what was then unthinkable (e.g. modifying the tenure system) is now becoming a creditable experience. (p. 15)

Oman (1972) establishes the same point with respect to program: "Institutions in financial difficulty try many new things. Those not in difficulty do not."

CONSISTENCY WITH INSTITUTIONAL TRADITIONS

While institutional readiness for change appears to be an essential condition for innovation, the innovation must nonetheless be reasonably consistent with institutional traditions, practices, and purposes if there is to be any significant chance for the proposed innovations to be successful, adopted, and eventually institutionalized. Thus, an institution which historically had offered a tightly prescribed general education curriculum might accept some modifications of those requirements and adopt some variant of distribution requirements, whereas it would reject out of hand a precipitous adoption of a completely free elective system. The adoption of a number of computer-based undergraduate courses at the University of Illinois, Urbana appears to be somewhat easier than at other midwestern universities, in part because of the reasonably long tradition on that campus of experimentation with PLATO--a computer system designed specifically for educational purposes. The adoption of a psychoanalytically-oriented teacher preparation program could take place at the Kansas Teachers College, partly because of the powerful influence of the Menninger Foundation in Topeka. But such an approach would be unthinkable in other areas.

REWARDS FOR USERS

An innovation or change must be perceived as having distinctive value for the individuals involved in it or affected by it, if it is to be attempted, adopted and continued. Granted that from the broadest possible perspective many practices in higher education could be considered cost-ineffective, yet from the narrower perspective much of what is done is judged efficient and economical. Polemical literature complains mightily against the lecture system and the regular scheduling of fifty-minute classes on alternative days. The lecture is shown to be a poor way of developing critical thinking abilities and less effective than books for the transmission of information. Yet, from the standpoint of both faculty member and student, such a system is quite efficient. The professor need make only occasional preparations or re-preparations, and changes required by evolving knowledge can be made relatively quickly and informally, even as lectures proceed. Lectures delivered in fifty-minute periods on alternative days allow professors considerable time at predicted intervals that can be used at their discretion. Similarly, students can exploit the regularly sequenced class meetings by arranging to be in class say from 8:00 to 12:00 on Monday, Wednesday, and Friday, thus leaving the balance of the week's discretionary time for a job, for recreation, or for whatever purpose the individual wishes. In view of this phenomenon the various constituencies within a collegiate organization can be expected to resist innovations and change that affect their various routines, unless there is a clear and obvious payoff either in the form of a new and especially desired value, or in the form of some ultimate efficiency of value to the individual.

Examples, especially negative examples, abound. During the 1950s the fad of academic programs for gifted students swept the country. For the most part, those programs did not succeed or last. Those programs which did succeed, as for example the Honors College at Michigan State University, seem to have lasted because they provided a payoff for students in the form of distinctively different activities and distinctively different symbols of status. Students were allowed to register early, were given their own physical space, were allowed greater freedom in the selection of courses, and were singled out as an elite. Also the 1950s and 1960s saw considerable experimentation with open and closed-circuit television. Macomber and Siegel (1960) made an interesting observation: Faculty members insisted that they teach a partially reduced load to offer courses over closed-circuit television, and that a single course over open-circuit television should comprise a full load. This was tacit recognition that organizing materials for television required more time than faculty members were willing to spend unless there was a compensatory reduction in teaching load.

A major motivation for institutions that encourage educational innovations is to reduce costs. Yet each means for reducing cost through varying the mode of instruction seemingly jeopardizes prevailing student or faculty preferences. This jeopardy will be tolerated only if appropriate incentives or payoffs (of financial or other sorts) can be contrived. Consider the following techniques for reducing cost. First, an institution may substitute low-cost labor for high-cost labor by replacing regular faculty time with lower-paid part-time faculty or graduate assistant time, or by modifying the balance between senior and junior faculty. Each change conflicts with the beliefs and desires of regularly appointed full-time faculty members, especially if a high proportion of them have achieved permanent tenure. Further, the use of part-time faculty and graduate students promotes student criticism that they are being shortchanged by a second-class kind of instruction. Secondly, an institution may increase the intensity of labor usage by raising teaching loads of faculty. In view of the struggle of faculty members during the 50s and 60s to obtain reduced teaching loads, this does not appear to be a particularly attractive device unless the incentive of substantially increased and assured salaries were used. The history of the use of such incentives is not particularly bright. An example is Parsons College in the 1970s, whose highly salaried faculty did not produce a viable educational program. Sometimes, of course, rewards have worked, as for example when Michigan State University created a purely teaching college and rewarded the faculty of it exactly as it rewarded the research and graduate faculty. The Basic College lasted longer than any other general education program, because of the reward system. Third, an institution might substitute student initiative for faculty supervision as, for example, creating more opportunities for independent study. Such a curriculum places faculty members in a different kind of role from one of performing in orthodox classes, and it probably produces more irregular scheduling of faculty time with discretion resting with

students. Additionally, it has in some situations produced student complaints that they were being shortchanged, receiving only a syllabus and a library card for their high tuition money. A fourth method is to substitute capital for labor by enforcing greater use of the library or by repeatedly using televised lectures in place of face-to-face lectures. But intensive use of the library implies considerable faculty guidance, and the preparation of lectures for television requires more intensive effort by faculty. Or an institution might intensify utilization of existing capital, as for example, using buildings and equipment more. However, to persuade faculty and students to work at unusual hours may require incentives in the form of higher salaries or lower tuitions that would in the long run deny the effectiveness of this solution. Relatedly, of course, the institution could, over time, substitute low-cost capital for high-cost capital through employing temporary buildings or using inexpensive building materials. Once again, the striking example of Parsons College, which unsuccessfully tried to use inexpensive building materials, does not make one sanguine as to the utility of this approach.

The significance of the incentive or payoff phenomenon can be illustrated with a number of brief examples. Indiana State University added a double session without expanding its physical plant. However, both students and faculty required incentives of salary increases or tuition decreases in order to accept the innovative use of physical plant. The use of dictating equipment at Bard College to improve the quality of theme grading did produce that result, but the scheme was discarded, largely because no incentives were provided for the faculty to compensate for the greater expenditure of time which preparing more detailed criticism of themes required. Professors grade themes rather quickly and scribble comments on margins of papers. Dictating produced longer comments but took too much time. Without rewards, professors declined to spend the extra time. At Emory University the faculty and students were persuaded to accept the curricular shift from five 3-hour courses to four 4-hour courses by the incentive of freeing Wednesday of each week from all scheduled academic and educational activity. At Michigan State University in the early 1960s the faculty members in the Department of Natural Sciences were persuaded to enlarge laboratory sections by five stations each through the incentive of substantial salary increases during a year of overall tight budgetary restraints. At New Mexico State University the departments in the College of Arts and Sciences were finally persuaded to ease up on graduation requirements in return for assurances from the central administration that departments would not lose positions even though enrollments dropped.

This discussion of payoffs or incentives may appear to deal only with superficial values. More profound value, such as enriched education or better use of student time, might conceivably operate. Unfortunately, most of the examples of innovations do not support such a view. Bowen and Douglass (1971) in considering various instructional patterns and their attendant costs point out that by including foregone income, tuition, books and supplies, and living expenses, student time is worth perhaps $3.60 an hour. Since that cost is fixed by the labor market, the only way colleges could economize on student time would be to raise the quality of instruction so that more is learned in a given time or an equal amount is learned in less time. Much of the rhetoric of educational reform contends that institutions are indeed trying to make the use of student time more efficient to them. However, the many actual examples suggest this is not really attempted and that other considerations, such as institutional savings or faculty convenience, are the operative ones. If colleges and universities were required to pay students for their time as they do other employees, a different posture would undoubtedly result.

PERSONAL INVOLVEMENT OF INNOVATOR

Related to the matter of incentives and motivation is the need for one or several people to become personally, professionally, and emotionally involved with an innovation to insure its adoption and institutionalization. Increasingly it becomes apparent that individuals who attempt innovation or change in institutions of higher education are somewhat marginal individuals with respect to the total institution or a sub-unit in the organization, but not so marginal as to be ineffective. Marginal is here used to mean an individual who is in process of moving from one significant reference group to another, but has not yet been established with the new group nor achieved a new role. Individuals functioning solidly within a department and imbued with departmental values are not likely to attempt major changes in course offerings, in departmental administration, or even in

prevailing modes of instruction. Similarly, individuals occupying central roles in the various administrative or governance units of an institution are not likely to quest for new approaches that might upset a balance favorable to them. Rather, the individuals who undertake substantial innovation and change are persons somewhat on the periphery of an institution or sub-unit. Being somewhat peripheral they can question prevailing values and examine alternative ways of doing things without threatening their own positions. However, once such a marginal individual begins an innovation he or she must obtain continuing satisfactions from the activity or else the pressures of resistance will prove irresistible and continuation of the activity will not seem worth the effort.

This concept of the marginal individual turned innovator can be elaborated by observing the evolution of new academic fields. In general it appears that those who become involved in the creation of new academic or professional fields are individuals who were originally trained or experienced in one field, but who for a variety of reasons found themselves marginal to that field. For example, the professional study of higher education as a unique phenomenon emerged during the 1950s and 1960s out of the efforts of a number of persons who had found themselves somewhat dissatisfied with their original academic affiliations. Thus, Paul L. Dressel migrated from Mathematics, David Riesman from Law and Sociology, Robert Berdahl from Political Science, and Joseph Katz from Philosophy.

Some of the dynamics involved here are revealed in several brief cases. In the early 1940s, President John A. Hannah, wishing to transform a small Michigan agricultural college into a major university, decided one of the first steps should be to reform the undergraduate curriculum. He asked a member of the School of Agriculture, who had been dissatisfied with the undergraduate education he saw students receiving, to chair a committee to study the institution-wide problem of undergraduate education. Thus a marginal individual was selected for the key role in producing an innovation. Once the committee had done its work and the total faculty approved the idea of a university-wide general education program offered by a separate college with its own budget and its own faculty, the innovator's position was legitimized through his appointment as the first dean.

This discussion should not imply that the existence of a marginal individual turned innovator is an essential condition. Many attempts at change and innovation are made by other kinds of individuals, including consultants, deans of instruction, deans of faculty, or professors who are simply curious as to whether something could be done better. It can be argued, however, that the phenomenon of marginality is an important element leading to innovation. Individuals who are generally satisfied with their positions in an organization and with their own performance are not likely to seek very diligently to discover ways of changing. It is the individuals who are not securely lodged in a satisfying role, or who have become disenchanted with mainstream activities and processes, or who while somewhat satisfied still see greater satisfactions elsewhere, who are most likely to attempt radical reform.

This point is counter to the notion that a successful and secure person is more likely to see needs and try to meet them. However, in the cases examined here the successful innovation is produced by the marginal style individual. For example, a new biomedical engineering program created by a good but dissatisfied mechanical engineer; a program to train teaching assistants in chemistry created by a good chemical researcher who saw greater satisfaction from teaching people to teach; or a program of a self-styled "kinky" engineer who created a center to improve instruction and a new core curriculum for all engineers regardless of field.

PREVAILING OLIGARCHY

Another element in innovation and change, although it may be involved differently, either to encourage innovation or to resist it, is the oligarchy of power and influence on college and university campuses. McConnell and his associates have identified three categories of faculty--gladiators, spectators, and apathetics. The gladiators are a relatively small group of people who take personal responsibility for participating in academic governance and who exercise an influence far beyond their numbers. This oligarchy frequently will be composed of faculty and administrators who, over the years, play a game of musical chairs with committee memberships, committee chairmanships, and

administrative posts. McConnell and his associates speculate that perhaps as many as 80% of a faculty either never hold committee memberships or do so only once. The remaining hold many memberships and in time will have served on most important policy making and administrative committees or commissions (McConnell and Mortimer 1971).

> These...oligarchs, usually control--and sometimes withhold from the electorate at large--the information on which decisions are based. The possession of this information enhances their potential power to guide decisions toward specific ends. Oligarchs often play a useful role in representative or democratic systems of government. They enable a larger organization to function efficiently. They do this in part by saving most members of the organization the necessity of acquiring, analyzing, and classifying information and also by acting expeditiously when it would be cumbersome and time-consuming for the larger group to decide the issues. [Oligarchs] as 'amateur administrators' may provide a bridge between faculties and administrations. But there are also dangers in oligarchic rule... oligarchs tend to become insulated from the feelings, perceptions, and views of the organization as a whole. Remote from their constituencies, they thus become less responsive to the changing moods of the body politic. Furthermore, they may become especially divorced from particular segments of the faculty. (p. 171)

Oligarchies may play an important role in encouraging or attempting innovation, if the members see personal or institutional values from doing so. Oligarchs also can serve as a massive barricade preventing any significant change in the status quo and linking their own positions and the welfare of the institution to long-established practices and procedures. If the oligarchy is opposed to change or innovation and there is no compulsiveness on the part of a would-be innovator, that probably will end proposals for reform. Occasionally, however, the impetus for innovation will be sufficiently strong that its proponents will risk a confrontation with the oligarchy. Such a development then seems to throw the matter into a political mode, as those who want change attempt through the creation of coalitions to depose the oligarchy or at least force it to reverse its position. Although oligarchies have not been analyzed carefully, several examples can indicate how at least some of them function.

The first example is the creation of a program of 13 interdisciplinary courses in international relations at Stanford University. During the 1960s Stanford had searched for better ways of providing for undergraduate students and for bringing them into contact with senior professors. A low-profile Center for Research in International Studies at Stanford University was created and placed under the leadership of the distinguished former Dean of the Law School who was finishing out his years before retirement by being of service to the University. He recognized that Stanford was a highly departmentalized university and that any direct attempt to produce new curricula that might lead to new majors would run into heavy faculty opposition. His plan was to develop a relatively low-profile program but one that would attract the interest, allegiance and actual participation of key members of the Stanford faculty oligarchy. He sought to interest senior professors who were strong enough within their departments to be able to direct their own activities with little attempt at abridgment by their home departments. A small group of senior faculty oligarchs, intellectually equal to each other, were placed on full salary for the entire summer, and were being asked only that they talk with each other about the problems of education in international relations. Out of these conversations the senior faculty members came to know each other more intimately and became sufficiently interested in a program in international relations to create a number of courses and to agree to commit a portion of their time to teaching such courses. The program was created and put into operation without departmental opposition largely, in the opinion of the chairman, because the prevailing oligarchy favored an effort by some of its members.

ADEQUATE FUNDING

Another essential condition is adequate funding to support the development of an innovation and its initial operation. Innovation and change not only require greater expenditure of time and energy, but also financial resources beyond those normally required to routinely sustain an institution. Relatedly there must be institutional readiness to provide sustaining financial resources if a particular innovation proves promising. The federal government and several philanthropic foundations sponsor thousands of innovative efforts, most of which cease when external funding is exhausted. Only when an institution is ready to commit its own resources does an innovation or change have much chance to be adopted and institutionalized. A new and demanding program for training teaching assistants in freshman chemistry at the University of Nebraska was begun with foundation support but continued because the university was willing to use its own resources to do so. A similar venture at Michigan State University proved, with foundation support, that improved teaching by teaching assistants could be developed. However, the program stopped because schools and departments would not use these new resources to continue what was really a relatively inexpensive program. One significant derivative of funding is adequate time to plan an innovation, to experiment with needed technology, and to become familiar with what is being attempted so that it can be made operational.

EXTERNAL FACTORS

Collegiate institutions are reactive, and much of what they attempt depends on how they interpret what the supporting society and the surrounding environment seem to expect or demand. Consider, for example, the increasing number of individuals seeking access to higher education, including large proportions of previously excluded students. As long as colleges and universities attracted chiefly upper middle class or upper class students who had already developed and learned the values of deferred gratification, the uses of knowledge, and high verbal facility, the educational task was relatively easy. Colleges and universities simply had to refine these traits and aptitudes. One reason colleges in the past seem to have had little impact on students may be because the desired outcomes of education were already so well developed. But as previously excluded groups began to enroll in college, assumptions as to preparation of students or as to effectiveness of existing educational practices were no longer warrantable.

Admissions standards based on a specific kind of verbal facility and previous academic success were inappropriate for students from the ghetto who used a different idiom and who regarded schooling as a waste of time, especially when it rarely led to economic preferment. Reliance on residence halls and fraternities to compensate for the lack of socializing in large classes was inappropriate for youth who could not afford those amenities. Foreign language requirements seemed anachronistic for youth not having mastered the idiom of the American middle class into which they wished to move. Clearly, if colleges and universities were to provide for these students, some modification of curriculum and teaching was needed. And some of the reforms of the early 1970s represent efforts to do so, as for example self-paced learning systems with students never failing but staying with a task until they mastered it.

A force difficult to gauge, especially in the United States, was the outburst of student protest and dissent in the late 1960s. The rhetoric of the protest movement implied a desire for serious educational reform. Students wanted an easing of the paternalistic requirements imposed on them by their institutions. They demanded courses that were more relevant to their interests and the problems of society. They argued that typical graduation requirements were moribund. They protested against the presumed impersonality of the larger institutions. Faculties and administration sought to meet those needs through new courses, easing of restrictions, and experimentation with new groupings of students and new systems of instruction which stressed the individual.

The paradox lies in the fact that more rigorous opinion surveys indicated that most students were not really dissatisfied--only the five to ten percent which comprised the core of protest (Carnegie Commission 1972). Most students' behavior revealed no great fear of large institutions. Throughout the late sixties the large institutions exhibited the greatest growth, the greatest willingness to change and the greatest tolerance of

student freedom. Further, students frequently rejected reform once the faculty attempted it. Enrollments in the hard sciences soared and those in the softer, more interdisciplinary courses remained constant or became so erratic that courses and programs had to be dropped. American higher education has always been competitive, with institutions vying with each other for students' resources and regard, and the competition began anew in the late 1960s as educational opportunity evolved from being scarce to plentiful. The student role of client produced attempts to reform. But the students--as capricious clients--blunted the efforts to change because what was attempted proved not to their liking.

This relationship between competition for students and efforts for educational reform is revealed by Oman (1972), who studied private liberal arts colleges. He asked each institution to classify itself as to its financial situation: No financial difficulty, heading for financial difficulty, or in considerable financial difficulty. At the same time he presented a comprehensive list of reforms or innovations and asked which ones institutions had been using and which they planned to undertake in the near future. The overall pattern of response was almost classic in its simplicity and its import. Institutions in financial difficulty planned to initiate a large number of changes, while those in sound financial condition planned relatively little change or innovation.

Competition for students is also revealed in the intensive interest in new kinds of students from 1970 onward. By 1970 it had become clear that the orthodox student of high ability and academic achievement and comfortable socio-economic circumstances was attending college in saturation numbers. It was also clear that there would be a decline in the number of those students by the end of the 1970s. Thus, if academic spaces were to be filled, facilities used and physical plant paid for, new students had to be recruited from the younger and older age groups and from segments previously not well served. It was also clear that traditional procedures would not be tolerated by new students. Hence, new educational configurations had to be found that would deal with the time constraints of working students, for example, or that would motivate them to pursue studies the faculty felt were needed. Thus by the end of the 1970s, institutions were offering accelerated bachelors programs that allowed considerable credit for life experience in order to attract working students who wanted a degree but would not tolerate traditional residence requirements or a full four-year program.

Underlying some of this attempt to conform to student expectations was the ultimate failure of the academic revolution. Jencks and Riesman (1968) have described how the professionalized faculties, during the first two decades after World War II, gained virtually complete control over their own lives. They could teach what they wished, evaluate their own performance, and determine who should enter their ranks. Because professors were in short supply they gained job security, light work loads, and salaries that increased each year at rates of about seven percent. As late as 1968 presidents of major institutions predicted that within a decade over half their faculties would be teaching one or no courses and that their salaries would continue to increase at the rate of seven percent per year during the 1970s. In such circumstances there was really no reason for professors to change their educational practices or, for that matter, to overly concern themselves with educational matters. But the bubble burst. Rates of expansion of student enrollments slowed and in some institutions enrollments declined. Federal and philanthropic funds began to dry up, eliminating one of the bases of professional political power. And while the public still valued higher education, its popularity dropped and the public began to demand accountability from professors. Among the consequences of this reverse of fortunes was the rediscovery of the undergraduate student, especially in the large research-oriented universities. No longer was the undergraduate only a source of funds and one who could be taught by graduate students or marginal faculty. Rather, the undergraduate was someone to be courted and provided with seminars offered by senior professors or new kinds of enriched courses. Some professional schools that in the 1960s restricted enrollment to graduate students began to offer courses and entire programs designed to please undergraduates. It is theorized that in any organization, whichever segment produces the greatest income eventually gains influence and then domination. In the 1960s graduate students were a major source of funds through participation in research contracts. However, in the 1970s the undergraduate student body emerged as the major source of funds through tuition or formula-based appropriations. To insure that those funds were forthcoming, undergraduate interests and needs became influential. Underlying many innovations was the belief that educational life had to be improved for undergraduate students in order to keep them enrolled.

Another powerful force promoting innovation was the emergence of various academic sub-specialties. The professional study of higher education developed during the 1960s and its representatives saw reform as a major reason for their existence. Centers for the improvement of instruction came into being with staffs who could safeguard their own professional position only through demonstrating that they did make a difference; i.e., produce change. The new magazine CHANGE could grow only if it were seen as a wellspring for innovation and reform in higher education. The work of the several commissions and task forces dealing with higher education policy could only be validated if they produced change toward a presumably more desirable kind of education. Publishers of books dealing with higher education required an expansion of new activity if their sales were to continue to rise. Out of such complex interests has grown a substantial pressure group whose purpose is to promote innovation, change, and reform.

An important ingredient to this pressure is the new kinds of institutions created in the late 1960s and early 1970s and devoted to the principles of experimentation and change. While many factors have entered into the creation of the University Without Walls, various new colleges, and freestanding graduate schools, several seem especially germane. By the late 1960s academic posts in established institutions began to be in short supply. To some academicians it seemed that the creation of some new kind of institution having a distinctive character was a good way to enter and stay in academic life when other more traditional avenues were closed. It is true that a great deal of idealism was involved as professors in those institutions sought to serve new populations. But it can also be speculated that a disproportionate number of people active in new institutions were really marginal with respect to traditional academic institutions and found opportunity in new ventures.

Other forces may be but briefly noted, in part because it is difficult to establish clear-cut relationships. Certainly during the late 1960s public criticism of higher education mounted and demands for reform became widespread. However, neither editorial comment, critical news reporting, nor the writings of protesting students explicitly suggested the kinds of reform desired, with the exception of public demand that students be controlled. If the use of the injunction, the preparation of contingency plans for meeting campus disturbances, and the development of student charters and judicial procedures are classed as innovations, then there was a connection between public criticism and change. Similarly, if the growth of statewide coordinating councils, supra-institutional boards and systems of campuses are judged as innovations, then the public and legislative concern for rising costs is clearly related to change. But with respect to the central acts of education--teaching, advising, testing, and the like--the power of public criticism was generally not involved in change.

Expanding educational technology certainly exerted an influence on the conditions benefiting change. The advent of television, transistorized tape recorders, video tape recordings, and the computer presented a tempting array of instruments with educational potential. Several of the larger corporations such as IBM, General Dynamics, and Westinghouse believed that the technology could force a revolution in the practice of education and that the revolution could be profitable. However, collegiate institutions proved highly conservative with respect to technology. So while available inexpensive technology is a necessary condition for some kinds of change, it has not been a moving force. Of course, it may yet become so. Videotape cassettes and portable computer terminals seem potent enough instructional tools that they may eventually command use.

Much of this analysis has stressed economic forces as producing change. They are important. However, there are other forces which draw on idealism, a strong egalitarianism, and an optimistic view that education is important and can be improved. Reformers certainly are aware of economic and status considerations. However, without people striving to better the human condition, no amount of financing, leadership, or technology would likely lead to much.

SECTION 3. UNSUCCESSFUL EFFORTS

Unsuccessful efforts to produce innovation or attempt change may be due to the absence of one or more of the factors listed earlier. In addition, this section looks to problems or barriers to innovation that are inherent in educational organizations--uniquely so in higher education.

Collegiate institutions possess a general form and structure which is well suited to providing certain kinds of educational services. So long as formal education was the principal commodity, a simple structure could work, even in institutions of considerable size. But during the last part of the 19th century and the first half of the twentieth century, collegiate institutions assumed two other major functions, service and research, but did not change their administration and organization to accomodate those new activities. For example, teaching and research are activities with distinctive styles and different, often contradictory, requirements for organizational structure. To the researcher, ideas are more important than people. The undergraduate student is less valuable than the mature graduate student who can assist with research. Scholarship generally is an individual enterprise and does not fit well into a department created primarily to organize teaching. Further, for scholars, judgment of their work will generally come from off-campus rather than their own departments. When libraries and laboratories were primarily adjuncts to teaching, they could be maintained on a relatively modest scale. The research component, however, required that those facilities continually expand and become more expensive. When scholarship was conducted primarily to prepare for teaching it could be done during summers or on an occasional sabbatical year. As the requirements for research scholarship increased, however, such limited amounts of time were insufficient. That time, especially in the larger universities, was taken from teaching and working with undergraduate students. This tendency was intensified by the fact that resources greater that a single institution could provide were required, and those funds lay outside of the effective control of the institution's administration. Faculty members came more frequently to regard sources of funding as the significant determiners of their activities rather than their own administrative officials. A tenured professor secure in a grant relationship could reject pleas from the department head or dean to take on more teaching or to improve teaching. Overall, then, the growth of research activities has undermined traditional organization structures and produced new structures frequently in competition with traditional ones. These dysfunctions have proved to be effective barriers to educational change although research has certainly changed the roles of professors.

A related organizational difficulty is that institutions of higher education are managed and governed by two distinctive structures almost superimposed upon each other. The first system is a hierarchical structure with a Board of Trustees at the apex which is legally responsible for the entire institution and its activities. This Board appoints a chief executive officer, establishes broad institutional goals and policies, and then delegates the actual conduct of the institution to the chief executive officer. This officer, in turn, presides over a relatively straightforward line and staff organization with typically three principal line subordinates in the areas of academic affairs, finance, and student affairs.

Superimposed on this straight hierarchical model is a collegial structure which assumes that faculty members are professionals responsible only to themselves and their colleagues. These faculty members decide themselves whom they will serve and with what technologies, and evaluate their own performance. Collegial tradition in colleges and universities grew slowly in the United States. First, professors gained hegemony over the subjects they taught, then some degree of control over the total curriculum and conditions of student life, then some degree of protection against authoritarian acts of Boards of Trustees and Presidents, then considerable control over the membership of the professoriate itself, and finally, the adoption of the theory, at least, that the professoriate was essentially the institution and hence had the right to control its destinies. What has eventuated then, is a dual structure with the two elements existing in a constant state of tension, and the net effect is a slowdown in the rate of adoption of changes. An extreme example is a complex midwestern state university where 24 months are required before a significant suggested change in departmental course offerings can be accomplished. The two structures, hierarchical and collegial, monitor each other at the departmental, school, campus, system and state level, thus producing interminable delays.

A second unique characteristic of colleges and universities is that they may very well be organized anarchies, according to Cohen and March (1974). Organized anarchies are defined as organizations possessing only problematic goals and operating on a variety of inconsistent and often ill-determined references. Such organizations are unclear about their goals and about the technology needed to achieve goals. Colleges and universities do not understand their own processes but operate on the basis of a simple set of trial and error procedures. Actual rational searches for procedures are based on historical accidents, imitation, or contrivances derived from dire necessity. Further, collegiate institutions possess no generally recognized way of evaluating the achievement of uncertain purposes and goals.

Organized anarchies pose several critical problems regarding innovation, change and reform. The first problem is how intelligent decision-making can be developed in a situation where goals are unclear. Relatedly, given the shifting nature of the clienteles and the varied and often conflicting purposes, how managers and decision-makers can establish priorities for their attention. Theories of management assume the existence of a well-defined set of goals and a clearly understood technology. Since these conditions are not often found in colleges and universities, we can question whether there can be an adequate theory of management that administrative officers can apply and that can be taught to aspirant administrators.

Resistance to changes and innovations in the educational realm of collegiate activity seems also to be related to the professoriate itself and the kinds of individuals who are drawn into college teaching. Future college professors seem to be people of considerable intelligence who at relatively young ages become intrigued with isolating activities such as butterfly collecting, star study, chemical experiments, or reading biographies. As those interests deepen, the incipient professors find more satisfaction in solitary activities and less satisfaction in gregarious undertakings. As college students, their interest in a subject deepens as does the quandary of what to do vocationally. By early graduate study years, they become convinced that college teaching is the only career which will provide income but still allow considerable time for reading novels, collecting, the study of history or whatever. Thus are produced professors whose main concerns are their subjects, supported typically by the perfunctory performance of teaching obligations. Serious concern for the processes of teaching or the coordination of one subject with others is viewed as pure distraction. Suggested changes in how subjects are taught are likely to be viewed as excessively time-consuming and are resisted. Obviously, other forces do motivate professors in their roles. Some faculty members like to work with the young; some become professors because of family tradition. Some use the role for upward mobility. However, the significance of the subject specialty cannot be overlooked.

As a general rule, one should assume that most experiments, changes, and innovations proposed for colleges and universities will be initially resisted. The prescribed curriculum of the nineteenth century college persisted long after its utility had ended. The values of good advising have long been demonstrated, yet few faculties have adopted effective systems which work. Television has been shown as an effective instructional device, yet its widespread use has not taken place. When attempted, experiments will be relatively short-lived, and they will be incorporated into the institutional fabric only with considerable difficulty. This resistence can be broken down by the prudential use of some manipulation techniques. But they must overcome substantial barriers which fall into several categories:

Institutional Regression
Lack of Evidence
Lack of Purpose of Change
Institutional Overload
Faculty Fatigue
Student Apathy
Failure to Examine History
Personal Relations
Departmentalism
Inaccurate Assessment of Social Need

INSTITUTIONAL REGRESSION

Despite verbal adherence to diversity and pluralism, American collegiate institutions tend to regress toward a mean or model type institution. In the last half of the 20th century the model American institution was large and growing, complex, serving a number of different purposes, and seeking not only to provide a single kind of education; e.g., liberal education, but seeking to embrace other forms of education as well. That model image becomes engrained in faculty and administrators through a long socialization process, and there is a tendency for such individuals to favor decisions which will move a given institution toward that prototypic form. The point can be illustrated by observing institutional mutations. The private liberal arts colleges having the single purpose of educating undergraduates then add teacher preparation, home economics, business, social work, and other professional and sub-professional fields and then enter graduate work, frequently in response to faculty feelings that their members are not respectable unless they are serving an institution offering graduate work. The teachers' college similarly mutates by adding arts and sciences to professional education, then other professional fields, and then graduate work, doctoral work, and research. Technical institutions such as Cal-Tech or M.I.T. add social science and humanistic elements to their programs until they become in fact comprehensive universities polarized around science. Even junior colleges reflect this movement in states where it is permissible for them to seek four-year programs. In states where such a change is contrary to public policy, advanced work is offered under the guise of courses for community service in the evening or extended day program.

The pressures for institutions to change in these directions are considerable. At the same time, much of educational innovation represents attempts by institutions to be different and to accomodate the needs of a pluralistic society. Thus, much attempted innovation must struggle against pressures for conformity. Schools of education create the doctor of education degree as an innovation to meet the peculiar needs of individuals who will become educational administrators, yet the prevailing norm for doctoral level work is the Ph.D. Hence, schools of education try to make the Ed.D as much like the Ph.D. as possible. More recently, the doctor of arts degree has been highly touted, yet when institutions such as Carnegie-Mellon University adopt the doctor of arts degree, pressures begin to mount immediately to make it comparable to the Ph.D.

The prevailing norm for a college teacher is to lecture to a group of students. The pressures of that norm are considerable, extending to guilt feelings if the teacher does other than lecture. Many suggested changes in teaching imply elimination of lecturing; professors can tolerate such change only if provided rather substantial psychological support. Once supports are removed, the tendency is to return to older modes. Some professors do seem to like the more consultative role which self-paced instruction requires. But even then, lecturing often creeps back in.

LACK OF EVIDENCE

Another constraining condition is the lack of relevant, persuasive evidence that innovations or changes produce results different from those obtained through more traditional ways. The effect of this lack can be seen only through inference, because there is little recorded testimony that lack of evidence is a significant factor in rejecting proposed change. It is unfortunately true that systematic evaluation, including measurement of results, is typically not included as a part of an educational innovation or change. If it is included it is casually done with the data far from sophisticated. The reasons are severalfold. First and most fundamental is that educational processes are so extraordinarily complex and the factors that actually produce educational change in people so variable that it is extraordinarily difficult to measure changes over time, and then ascribe causation to some single variable, such as a new curricular structure or a new mode of teaching. So many different things that can have educational impact happen to individuals, even during relatively short periods of time, that to claim a programmed course in economics, for example, brought about a perceivable change is highly speculative at best.

Secondly, many educational innovations are intended to be qualitatively different from previous practices to such an extent that it becomes meaningless to compare the

performance of students who have taken an interdisciplinary course in engineering design with students who have taken other courses only tangentially focused on problems of design. Suczek (1972), in reflecting on the experimental college at Berkeley, ended his rather comprehensive and complicated evaluative study with the remark, "To compare an experimental program with a conventional program--especially in terms of quantitative measure--leads to the anomaly of comparing qualitatively different entities on a quantitative basis. More important, such a comparison is based on the questionable assumption that two qualitatively different experiences can (and perhaps should) be expected to lead to the same quantitatively-measurable consequences." (p. 177)

Even if these two difficulties could be overcome, others intrude. Systematic evaluation requires technical skills of instrument construction, sampling, research design, statistical analysis, and the ability to make educational and psychological inferences from data. College professors, except in the professional fields directly concerned with those skills, simply lack them and either must use quite primitive techniques of assessment or obtain the services of technically qualified associates. The former course produces little information of value and the second complicates the educational innovation and increases the cost. In addition, systematic evaluation is an enormously time-consuming activity. Consider a rather uncomplicated design that would require pre- and posttesting of an experimental and control group, each taking the same semester college course but through different modes. The pre- and posttesting should include a test of knowledge, several attitude tests, and one test of critical thinking. The construction of a 50-question college test with sufficient reliability to insure confidence in the results requires a minimum of an hour per question. To produce a single 21-statement attitude test that can obtain a rank ordering of attitudes requires a minimum of 100 hours. And a short half-hour test that can be objectively scored and that measures several critical thinking abilities will normally require two or more hours per test question, if sufficient reliability is to be obtained. Thus, for the sheer construction of measuring instruments this simple innovation would require at least 350 hours of work by a technically qualified individual. Few plans for innovation budget for such an expenditure of time. Even if such a sophisticated evaluation were reasonable, all too frequently the results are inconclusive with the final generalization being "No statistically significant differences occurred between the experimental and the controlled group." Thus at the end of the attempted innovation there is little way by which others can be shown the values of the innovation, other than through persuasion, political manipulation, or in a few situations, by fiat.

Problems of evaluation are reflected in several quite different educational changes. One project involved computer-based learning in American Government. The professor and his graduate student first prepared six games involving political science principles applied in such complicated phenomena as a tenure dispute involving a teachers' union or a congressional committee chairman attempting to steer a higher education bill through a committee. These games were prepared for use in a computer with the intent that when all six were prepared they would be orchestrated into a full college course. The original plan called for using the full new course experimentally during the summer session. However, light student enrollment forced postponement until the fall of 1970. When finally conducted, the experiment involved 100 students who took the new course, which was divided into alternative weeks of formal lectures and work at the computer console playing through the six games. An important part of the original design was to have been a pretest, posttest assessment. However, for a variety of reasons, including the possibility of some departmental suspicions, the formal assessment did not work because of the poor quality of the test materials.

In another experiment, a modularized course in critical thinking, careful evaluation was an essential part of the original design. However, the concerned professor encountered much delay in constructing the modules. Evaluation had to be postponed and finally was eliminated In addition, neither the professor constructing the course nor those who had been solicited to help with the evaluation were knowledgeable concerning measurement of critical thinking. In another situation, a professor who attempted to use simulation games to teach principles of experimental psychology was himself technically competent to design and conduct psychological inquiry and to carry it through a systematic pre-test, post-test psychometric study augmented by information obtained from student questionnaires. However, the measurement revealed no significant differences on any dimension between the experimental and control groups. The professor had to rely on his own persuasion that a number of profound changes did take place. In all likelihood they did, but impressions will not generally convince others to adopt a new device.

This matter of the significance of lack of persuasive evidence as a condition of failure is complicated. There is some reason to believe that the presence of considerable evidence still does not produce widespread adoption. Milton (1972), for example, identifies a number of prevailing faculty practices, such as belief in transfer of training, faith in grades as indicators of subsequent performance, adherence to lectures as an important mode of instruction, and insistence that students spend a specified period of time gaining a formal education. He then summarizes voluminous research that indicates the opposite of each of those beliefs. Yet the beliefs persist and the practices continue in their time-honored form. At a policy level, however, the impact of evidence can be observed. The Progressive Education Association's eight-year study demonstrated that the particular pattern of courses students took in high school bore no relationship to their academic successes or failures in college. This finding eventually helped to ease college or university imposed entrance requirements, which had specified in great detail what courses students must take in high school. The Report on General Education in School and College demonstrated considerable redundancy between high school and college curricula. The Advanced Testing Placement Program seems to have emerged quite directly as a result of this finding. Perhaps the most which can be said is that the absence of persuasive evidence concerning the effectiveness of an innovation or change can facilitate resistance to the change, but that the presence of even overwhelming evidence may or may not contribute to adoption, depending upon a variety of unknown variables.

LACK OF PURPOSE OF CHANGE

In a similar vein, the lack of a clearly expressed purpose or reason for a proposed innovation or change may be a significant condition for failure. In one university a newly appointed dean wanted to attempt a curricular reform, yet its purposes were never specified and the students and faculty saw no reason to expend the effort the proposal required. Academic people tend to be quite conservative with respect to education practices and are apt to resist proposals to modify practice, in the absence of clearly defined purposes. Further, demonstrating the validity of purpose is no easy matter. Ladd's analysis (1970) of institutional self-studies suggests that where study and report processes were intended to challenge the status quo or to create an atmosphere conducive to the acceptance of change, the studies were largely ineffective. However, if there was widespread acceptance of the idea that changes were needed, then faculty members could see the purpose of a study and of implementing its recommendations, and the total effort proved reasonably effective.

The precise function of specified purposes or goals in relation to innovation and change is made more complicated by the fact that universities as organizations seek many goals and have many purposes and that individuals also have purposes and goals which they try to satisfy within the organizational context. A particular change in practice may be suggested for a very definite organizational goal, such as balancing a budget through increasing the teaching load of professors, yet be antithetical to the goal of individual faculty members to have more time to spend on their own research. The opposite also can happen. For example, innovation to enable a faculty member to teach a unique course which develops critical thinking skills in students through intensive individualized work would be antithetical to the purpose of the dean of the college who wishes to maintain a student-faculty ratio high enough to satisfy statewide coordinating agencies. It can at least be theorized that the changes for successful implementation and adoption of an innovation are related to the degree of congruence between the organizational and individual purposes and goals affected by the change. Thus, in a situation in which a university wishes to achieve eminence in graduate education and research, and individual faculty members wish to work with selectively-chosen graduate students, a suggested upward change in student admissions standards is likely to be accepted.

In general, then, it can be argued that optimum conditions for successful use and/or adoption of a significant change involve a clear understanding and acceptance of purpose by the user and those affected by the change, facilitation of personal goals of the user and those affected, and consistency with organizational goals. As a positive example, the biomedical engineering program at the University of Miami was designed by an individual who obtained considerable satisfaction from close working relationships with the School of

Medicine. The resulting program produced qualified practitioners for which there was a lively demand, and the program was relevant to student expectations. It also furthered the University of Miami's desire to obtain a more substantial posture in graduate education without the necessity of entering full-scale into a Ph.D. program.

In contrast, the development of an interdisciplinary undergraduate course on man and the environment failed because of the lack of the above-mentioned conditions. The course was undertaken in response to constant but rather vague urgings by the dean of undergraduate studies that faculty members should pay more attention to the needs of the undergraduate students. The professor had become vaguely dissatisfied with a similar course and had thought casually that focusing on critical thinking might give the course some appeal. He had hoped he could recruit graduate students to construct case materials which would comprise the course, but when he failed to obtain the needed assistance he allowed the work to lapse because he was unwilling to take time from his own research to develop the cases. In reflecting on his decision, he somewhat wistfully remarked that such choices would generally be so resolved as long as the prevailing reward structure persisted in major American universities.

INSTITUTIONAL OVERLOAD

If a given organizational system is overloaded with too many undertakings at one time, the chance for successful implementation and/or adoption of change decreases substantially. This phenomenon may be operating in larger, more complex institutions which seem to generate a great many innovations and changes of which only a few are adopted. There might be some sort of optimum rate of innovation. In conditions where rates are low, there is insufficient stimulation in the environment to maintain generative activities. On the other hand, if rates of change go appreciably above optimum the organization and its members appear almost frenzied, with no time to perfect change or to cultivate the adoption and institutionalization of change. As an example of the latter situation, the School of Education at the University of Massachusetts, Amherst, under the leadership of a vigorous individual, is regarded as one of the most active schools of education in the country. Literally hundreds of projects have been undertaken dealing with teacher preparation alone. Yet the very plethora of programs has resulted in diluting the impact of any particular project, so that no one can judge with any certainty what the central thrust of the teacher preparation program in the School of Education actually is. At the opposite extreme was an eastern women's college generally regarded as an attractive haven for underachieving upper middle class girls, located on a campus of jewel-like beauty in which an intellectually arid faculty offered a curriculum that had changed in no significant regard for a decade. No faculty member had undertaken any summer activity for professional improvement for the previous ten years, and faculty members appeared resentful of suggested educational changes or innovations as they might be disruptive of a pleasant lifestyle.

It is difficult to decide whether hyper- or hypo-activity is the more destructive of institutional inability. During the late 1950s and early 1960s the University of Pittsburgh under the leadership of Chancellor Litchfield attempted major changes and reforms in almost every part of its operation. The institution adopted the trimester system; it adopted a new and complicated administrative structure; it adopted a new faculty and student recruiting posture; it attempted major curriculum revisions; it attempted to speed up its graduate and research programs, all to become a distinguished national university within a decade. The hyperactivity produced so many dysfunctions and such a serious drain on the financial forces of the institution that the University of Pittsburgh was forced to seek affiliation with the state system of higher education in order to remain economically solvent.

FACULTY FATIGUE

Related to institutional hyperactivity is the problem of faculty fatigue. This can be illustrated in a number of ways. Institutional self-studies that produce rich catalogs of suggested innovation, change and reform all too frequently produce little actual change, in part because faculty energies are so drained by the self-study effort that they have little energy left to implement the suggested changes. Eloquent testimony on the same matter is provided by officials of newer institutions that have been called upon by

regional accreditation associations to conduct several self-studies within a three or four-year period, while at the same time fashioning programs sufficiently interesting to attract students. Their faculties were just too tired to attempt one more study or to undertake one more major reform. How to gauge faculty fatigue is perplexing, for the optimum time between major innovative efforts rests some place between hyperactivity and educational doldrums. If self-studies are used to facilitate change, probably at least five years should intervene between the completion of one and the initiation of another, and no self-study should consume more than 18 months, and probably should be concentrated in nine months to a year.

STUDENT APATHY

A frequently overlooked condition of failure of educational change is student apathy about the traditional modes of education. This is paradoxical because many educational innovations and reforms have been implemented by faculty and administration eager to satisfy student needs. The desire is historically an essential of American higher education. With the exception of the 1950s and 1960s the bids to satisfy students have been highly competitive, there being more spaces than applicants. But once the new interdisciplinary course, or new teaching method, or new counseling system, is put into effect and the immediate euphoria passes, students appear disinterested and return to more comfortable and regular ways of obtaining their college education. And students have reason. Pass/fail grading or the elimination of grades D and F seem to please students momentarily but they quickly find that the traditional symbols represent a much more valid legal tender than the new symbols. Deep emersion in a subject by an intimate group proves to be psychologically exhilerating for a time, but students quickly discover that participating in the governance of a group and setting problems rather than having them be set consumes time and emotion, thus precluding other kinds of desirable activities. Students find courses aiding in self-discovery initially appealing until the demands for public disclosure and self-confrontation intrude.

FAILURE TO EXAMINE HISTORY

A possible condition for failure of many innovations is the lack of collective memory or actual history as to what had been tried before and to what effect. Most of the successful innovations outlined earlier are contemporary attempts to refine methods of instruction long in use. Thus, television allows better-prepared lectures and computers allow more precise drill and recitation. Interdisciplinary courses are in many respects 1970 versions of 1940 general education courses. A particular case in point is found in professional education, with the 1973-74 fad being competency-based training programs. Few people attempting competency-based programs realized that the concept had come to the surface twice since the early 1920s, was given a serious try, but fell into disuse. Contemporary faculty members not knowing of the mistakes of the past seem destined to repeat them. Of course, one cannot be sure that there are workable ways of providing faculty members with knowledge of the past outside of a thorough search of the literature. And one can be even less sure that knowledge of past mistakes will be heeded. This argues for more systematic reporting of innovative practices especially where there is likelihood of repetition by other institutions of higher education.

PERSONAL RELATIONS

Time and time again attempts to innovate appear to be affected seriously by personal relationships, personality peculiarities, or changes in personnel. A project involving development of creativity in engineering students fell apart because the conception of creativity held by one member of the project team (based on factor analysis of intellectual traits) was contrary to that of another member (based on the concept of self-actualized personality). A major research study on life careers of black graduates from predominantly black and predominantly white institutions was completed extremely late because the originator of the proposal was a descriptive sociologist and his successor a mathematical sociologist. A promising attempt to reduce attrition at the University of Akron faltered when the person responsible for the undertaking was promoted to be graduate dean. At another institution an attempt to inject psychoanalytic theory into the preparation of teachers faltered when a new academic vice president rejected as completely

invalid the entire psychoanalytic set of postulates. An attempt to develop a course on critical thinking was slowed to almost a standstill as the director of the undertaking pondered seriously a move to another institution and encountered some animosity by his department head and dean. Of course, the converse also can operate. At the University of Illinois the graduate dean was a powerful individual. The fact that an incumbent to that position was enthusiastic during much of the developmental work of PLATO (an elaborate computer designed for instruction) contributed materially to the many attempts to use the computer.

This matter of personality seems critical enough to require further elaboration. Very real ideological differences that can split or polarize faculties do exist, making a staff-developed curriculum or a staff-contrived innovation difficult if not impossible to achieve. Some faculty members are obviously oriented toward research and see as their principal obligation replicating themselves in the young students they encounter. Others with a more applied experience oppose this with the issues frequently being predominance of theoretical or applied courses and amount of field work. Contemporarily, many faculties are split over quantification. Some faculty members believe that most phenomena can be best understood through reducing them to numbers and manipulating the resultant statistics. Others feel that a preoccupation with quantification misses the variety and intensity that characterize real-life situations. These differences can quickly degenerate to personal animosity which does affect educational matters. Personal animosity often derives from basic ideological differences; e.g., advocates of behavioral modification feel that their system is so reflective of reality that they come to question the judgment or even the integrity of Freudian-oriented scientists. In recent years entire professional schools have been virtually paralyzed through the schisms produced by animosities. One midwestern school of social work reached the point at which behavior modification advocates ceased speaking with those of other persuasions. It required the appointment of a new dean and the resignation of several of the most intransigent faculty members before tranquility could be restored.

DEPARTMENTALISM

With respect to educational change and to innovations involving institutional administration, organization, governance and financing, academic departments and the spirit of departmentalism stand as a major barrier. The creation of academic departments focused on subjects or disciplines was one of the first academic revolutions in the late 19th century. Since that time departments have evolved into the principal haven for academic people, providing them security for their work, protection against the ambitions of rival departments, and a symbolic expression that professors are historians, economists, or physicists first and foremost and not teachers or educators. As departments grow and become strong they mark off the boundaries of their members' concerns and resist attempts by outsiders to encroach on those concerns. At the same time, they serve as limits that department members can go beyond without fear of losing their basic security. Departments have introduced courses reflecting the specialties of their members and indicating the parameters of a discipline. They have also been the vehicle by which future professors could be trained and socialized into the culture of the particular discipline. They have been an admirable device to encourage faculty members to engage in specialized research and to refrain from scholarship that might transcend the departmental lines.

Generally departments fall into one of three categories, each functioning differently as barriers to change. First is a university-oriented department, usually found in institutions of moderate size that concentrate their major energies on undergraduate education. Funds and lines of authority stem directly from central administration, and the department and its members align themselves closely to university purposes and goals. Departmental chairpersons in such units are senior individuals, generally appointed to the post by the dean. These individuals see themselves as administrators and are willing to use prerogatives of administration to guide departmental activities. As universities become larger and more complex and develop more concerns for research and graduate work, the orientation of the department shifts. There continue to be strong department heads, but the single authority increasingly comes under the criticism and scrutiny of younger faculty members who are more concerned with research reputation than with institutional goals. Such departments frequently give the impression of being divided, with the older and senior members loyal to institutional purposes, and the younger ones looking outside

the university for their psychological, political, and economic support. As the university becomes still more prestigious and nationally-oriented, and as the proportion of faculty holding distinguished research reputations increases, departments mutate again to the posture of disciplinary orientation. Departmental members become more independent and look to sources outside the university to fund their activities. If senior faculty members become department heads it is through election and only for one or two years' duration, for faculty members prefer the satisfaction of their own research and work with their own graduate students. Department heads also may be relatively junior faculty members appointed to the position, with the expectation that they will in no sense be leaders. Rather, they are expected to take care of the details of the day-to-day functioning of the department, leaving the department members free to go in their own directions.

The degree to which heads in university-oriented departments are interested in educational or curricular matters is important to the issue of barriers. When the heads are favorably disposed, the departments can become examples of educational innovative behavior. However, if the department heads fancy themselves responsible administrators they likely will be wary of extending innovative activities to other departments for fear of possible competitive advantages to others. If departments do not happen to be overly concerned with education, they are still likely to resist efforts by central administrators to economize and to develop better reporting systems and the like. University-oriented departments become small empires with their leaders jealous of their prerogatives, including control over positions, and resistant to administrative changes such as institution of departmental personnel committees or departmental policy committees.

Within departmentally-oriented units there is the problem of ambivalence with older faculty members jealous of their positions and resistent to the ideas of younger members. Younger members will evidence interest in change so long as the change increases their own influence or produces resources for their own research and scholarly activities.

In the disciplinary-oriented department there is no departmental leadership and whether or not faculty members are interested in educational innovation is their own business. If senior professors do become interested, their colleagues accept that as idiosyncratic behavior but feel no obligation to reinforce their efforts.

The spirit of departmentalism essentially elevates the value of a subject to primacy over all other possible values. In furtherance of a subject, new specialists are recruited and new courses adopted. Suggestions that faculty members might do work outside of a discipline are antithetical to the spirit of departmentalism. Similarly, administrative encroachments on the department are viewed as defiling the sacredness and symmetry of a well-developed field of study. Departmentalism is glorified and its exponents redeemed when bright younger people elect to major in a subject and to pursue graduate work so as to eventually qualify for a departmental priesthood. Profane activities in the light of departmentalism include being required to teach service courses, to combine with other departments to teach general education courses, to place the needs of the students above those of a subject, or to see the substance of a discipline diluted for the sake of non-major students. Consider for example the feeling in some classics departments that their courses should never be taught in translation. To translate is to defile. How departments function has been well examined by Dressel, Johnson, and Marcus (1970).

INACCURATE ASSESSMENT OF SOCIAL NEED

A major stimulus to innovation, change, and reform is the desire by institutions to satisfy their clientele. Colleges and universities, if they are to survive as social institutions, must detect and respond to social needs, demands, pressures, and changes. Universities and colleges are collectively the social institution created and supported to provide specific services that people and society need and desire. When they fail to provide these services, or when they provide service irrelevant to the existing needs of society, colleges and universities risk the possibility of their own survival. The 19th

century American college, for example, almost ceased to be a viable educational institution, simply because programs involving classical and philosophical curriculum were irrelevant to the needs of the people who were busy trying to assimilate the fruits of the industrial and scientific revolutions and conquer and control the continental-sized land mass.

Whether colleges and universities can be sufficiently astute and accomodating is conjectural. Their collective histories present in almost equal measure correct assessment and response, faulty diagnosis, and ineffective or no response. On the positive side, collegiate institutions at the end of World War II were able to perceive in time that veteran enrollments would be larger than expected and that institutions would have to modify their physical plants, faculty recruitment policies, and educational instruments if they were to meet the veteran demand. In the early 1950s higher education, heeding the warnings of one of its members, began to prepare for the impending tidal wave of students produced by post-World War II's sharply increased birth rates. By the time these children reached college age, capacity was available to serve the majority of those wishing college education. A few college and university presidents and professors also sensed that the several research triumphs of World War II heralded a new day when research would become pivotal in the society, requiring a partnership between the expertise of colleges and universities and governmental support and direction. Plans were made to redeploy faculty into research efforts and to prepare cadres of research workers. The oversupply of Ph.D.s in the 1970s resulted directly from federal, state, and institutional policies designed to do just that.

At the other extreme, episodes of collegiate obtuseness and unresponsiveness have been numerous and critical. Until the death of Martin Luther King, Jr., collegiate institutions acted as though there were no racial revolution, despite heightened demand by blacks and other minority groups for inclusion into the mainstream of higher education. While the courts and the Congress were responding, collegiate institutions, with few exceptions, were not. Institutions did virtually nothing to modify admissions standards, actively recruit, provide financial support, or modify curricula to conform with minority group needs. In another instance, few educational leaders in the 1960s foresaw that continued increases in financial support for higher education ran contrary to the intractable law of nature that exponential increases of anything cannot last long. Just a year before the first glimpses of impending financing difficulties became apparent, university presidents could state in all seriousness that faculty salaries would increase at rates of 7% a year into the foreseeable future and that state contributions for pure research would increase exponentially through the 1970s, 1980s, and beyond. Only a few insightful individuals, including Harold Taylor, President of Sarah Lawrence, and Clark Kerr, President of the University of California, saw early that expanded size of institutions, increased heterogeneity of student body, and an almost calculated impersonality by faculty members caught up in entrepreneurship would produce revolutionary outbursts by disenchanted students in times of racial turmoil and war. For the most part, those few warnings were unheeded, and even in 1964 educational conferences could be held and books and articles written that did not mention student problems. John Corson's 1960 classic on academic governance did not include the word student in the index. The events at Berkeley in 1964 caught higher education completely unaware, since its leaders were convinced that the silent and apathetic generation was indeed a reality. This sort of myopia certainly affects innovation. In almost a random or capricious order, those in higher education pick out emerging issues and evolving needs and attempt to make modifications to resolve or meet them. Identification of the wrong issue jeopardizes successful innovation just as much as responding incorrectly to the right issue.

Since the end of World War II, higher education has claimed to to be able to do too much. Claims of omnicompetence result in misunderstanding of needed innovations and changes--thus enhancing the likelihood of failure. Colleges and universities seem to need to make more realistic claims about their objectives and proficiencies. They cannot do everything their catalogs say they do. Liberal arts colleges cannot prepare students for the many vocations implied by the various professional and pre-professional curricula listed. Graduate schools of education cannot prepare the many different specialists they claim the profession needs, nor can schools of business, journalism, librarianship, or social work. Junior colleges cannot offer the intimate counseling they claim with the size faculty their resources allow. Nor can a program of general education produce people with deep awareness of science, a mature set of values, an appreciation for the great and beautiful, and a lifetime devotion to learning. Colleges and universities are well

prepared to do a few things well. They can occupy the time of late adolescents until the work force is ready for them. They can develop and improve language and number skills. They can provide some time for the young to think about who they are. They can instill a limited amount of generally needed information to enable people to communicate with each other. They can create opportunities for young people of the same age group to interact with each other. And they can train some students in particular skills needed in some vocations. These are all worthy functions and are quite properly enough reason for the existence of an institution. If higher education were to adopt a more parsimonious statement of purposes and goals, then innovation or change could be more effectively contrived. It may be of course that there are other needs that institutions should serve. If that be true, then either additional resources must be provided or else institutions must drop some activities in favor of new ones.

SECTION 4. IMPLICATIONS FOR SUCCESSFUL INNOVATION FROM THEORIES OF ORGANIZATIONAL BEHAVIOR

In the previous two sections, factors contributing to success or failure of innovations in educational institutions produced a reasonable but still incomplete profile of an innovative situation. Additional insight may be obtained from careful examination of many different organizations, whether bureaucratic, political, or structured as a community. Such an examination suggests a number of different characteristics which are facilitative or restrictive of innovation and change.

The following description portrays a college or university as an example of organizational behavior. An innovative college or university is a reasonably complex institution consisting of a substantial number of specialists, specialized schools, and departments whose members are highly professionalized. However, there is also a generally recognized and acknowledged centralization of authority that is exercised flexibly to encourage inventive thinking by individuals and within subdivisions, but with sufficient will and capacity to contrive consensus on a least a few innovative activities. The institution possesses enough wealth and power so that needed slack resources can be devoted to innovation without seriously threatening ongoing operations of the institutions. The relationships between individuals in various parts of the institution are reasonably close. There is a formal and informal network of linkages that can facilitate interaction concerning innovations. The institution is quite sensitive to changing social and economic conditions and possesses techniques to sense genuine changes or threats in the external environment. It also possesses techniques to detect discrepancy between achievement and expectation and develop that evidence into persuasive communications to the various institutional constituencies. The institution also is linked, at least informally, to other contiguous institutions or to institutions feeling an ideological kinship and there is a great deal of exchange of information as to problems faced and solutions attempted.

Such a profile is derived from a variety of viewpoints concerning organizations, all of which are consistent with the cases presented in this monograph. An organization can be defined as a social system created for attaining some specific goals through the collective efforts of its members and whose structure specifies its operations. Such a system imports energy from the external environment in the form of people, raw materials, capital and the like and transforms those raw materials into some product or service that is then returned to the environment in exchange for new raw materials. Organizational viability and survival thus depend on its ability to maintain a favorable rate of exchange between its output and the environment. Organizations reflect a much higher degree of specificity of structure and coordination than any other assemblage or aggregation of people found in a society. To a considerable extent the amount, kind, and frequency of innovation and change within an organization are a direct product of its relationships with its external environment, while innovation and change represent efforts to adapt to and to influence the total environment. Present evidence suggests that factors in the external environment have considerably greater potency for the stimulation of innovation than internal factors (Zaltman et al. 1971)

Generally organizations, whether they are education, medical, military, or business, exhibit characteristics that make innovation and change difficult. Hefferlin (1969) has

extracted from the literature five such characteristics. (1) Organizations seem to be inherently passive as they continue to exist through repetitive interaction of their members. (2) They exist in order to routinize behavior, to insure the efficient continued performance of some task. (3) To some degree, organizations are hierarchical, conferring on some members the power to influence those routinized procedures. (4) Organizations tend to be self-selecting and attract new members whose views and values are compatible with those of the organization. (5) Organizations tend toward institutionalization and ritualism, thus insuring organizational stability. (pp. 10-13)

One of the tests for successful innovation is the extent to which it has become institutionalized and can function without regard to the specific individuals carrying on the new process. Ritualism is illustrated when the process for achieving some goal becomes the goal itself. For example, the study of foreign language was originally adopted to insure that members of certain classes in society could function in multilingual situations. Gradually, the study of foreign language came to be viewed as an end in itself, the potency of which can be gauged by the heat of faculty discussions about modifying foreign language requirements.

Organizations also tend to evolve primarily into means of livelihood for their members. The relative importance of organizations may become clouded as a result. The National Organization of Higher Education in the early 1970s continued to create new sub-units such as supra-institutional boards and professional staffs. Even though the rate of expansion of higher education had begun to decline, such supra-institutional agencies represented a way of accommodating professional members whose services were not needed for on-campus programs. Some of the resistance of professors to educational technology also may illustrate this point. Even though television may be more effective, it could cost jobs of accepted members of the profession even though providing jobs for others.

Of the different structures organizations may adopt, the bureaucratic structure is major and highly visible. In a bureaucracy, a hierarchy of authority holds individuals accountable to superiors for their behaviors as well as for their subordinates. A substantial division of labor among positions within the organzation allows for a high degree of specialization. Uniformity and continuity of task performance are assured by rules and procedures that permit or even demand that individuals carry out their tasks impersonally.

Lastly, people employed by a bureaucracy are accepted into the organization because of technical qualifications, and work within the organization constitutes a career (Zaltman et al. 1973). Bureaucracies possess a number of virtues to commend them as a desirable organizational structure. They can be efficient in the sense that large bureaucratically organized industrial organizations can provide cheap, durable, and plentiful products. The large college has the potential of being an efficient college by providing larger faculties, greater variety of courses, and better services, all at lower costs. In a sense a bureaucracy represents the collective wisdom of a society that has found that certain structures are more effective than others. Higher education probably represents organizationally the rationality that generations of educators have employed to organize education. In addition, bureaucracy, particularly large-scale bureaucracy, offers opportunities to individuals. It has been pointed out that large universities experienced more student protest during the 1960s than small ones, but at the same time large institutions offered more variety for students and professors and more opportunities for self-fulfillment.

Difficulties arise, however, when applying a bureaucratic model to collegiate institutions. The hierarchical principle interposes barriers to communication from lower to higher echelons. Bureaucracies presume predictability of behavior and acceptance by individuals of definite ways of doing things. A bureaucracy thus abhors conflict. Yet conflict, or at least tension, among people of differing ideas may be essential for innovation. Relatedly, bureaucratic organizations presume certainty on the part of decision-makers, but such a presumption limits the search for alternatives that again is an essential for change and innovation. Innovative organizations constantly scan their environment to detect emerging variations and to consider internal adjustments to them. It is this constant observation of the environment that makes the organization innovative. This is in contrast to the bureaucratic organization that, in its pristine form, makes plans based on an assumption of predictable events in the environment.

Such weaknesses of a bureaucratic structure have led to examination of other models which might facilitate the functioning of the organization, such as a communications model which requires many different formal and informal channels of communications, or a political model which requires a great deal of grouping and regrouping of people and interests as conditions change. This search is encouraged by empirical data that show that the bureaucratic model does not explain how decisions are in fact reached. Baldridge (1971), for example, in examining how a number of changes took place in New York University, found that the political model was a much more powerful tool than the bureaucratic model. The important point is that organizations can be structured in different ways and that there probably is no one best structure to fit all conditions. Very likely, viable organizations function differently at different times, as for example, functioning bureaucratically under stable conditions, politically under changing conditions, and even autocratically under crisis conditions. Benner (1974) studied how Stanford dealt with demands for elimination of ROTC. Before the crisis negotiations were handled routinely by subordinate administrative officers. As tensions mounted a great deal of political bargaining took place among student groups, ROTC officials, and key administrative officials. At the very peak of the crisis the president's office assumed full responsibility to resolve the issue. The fact that organizations do and probably should alternate among several different structures is underscored by some of the generalizations concerning innovation and change that research on organizations has produced.

Regardless of whether organizations are bureaucratic, political, or anarchistic, they tend to behave similarly until forced to do otherwise. Organizations generally continue to function in historic ways and do not search for change or innovation as long as expectations and actual achievement are reasonably close; i.e., a college should do what a college does. When faced with a discrepancy between these two, the organization acts like an individual solving a problem. Individuals, when faced with a problem, search their memories until they encounter the first solution that seems to have relevance. The individual generally will not examine all alternative solutions, but rather will search through levels of solution until a plausible one is found. At that point the individual tends to make a decision or take action. The levels of solution through which the individual searches appear to possess an hierarchical order with solutions over which the person has control examined first, solutions requiring external resources second, and a re-examination of the criteria that a program must satisfy last.

Organizations follow somewhat the same scenario, reaping certain advantages and disadvantages from group problem-solving efforts. Generally, although there is a continuous mild pressure toward innovation and change, satisfactory organizational performance is likely to be very close to actually achieved recent performance. Discrepancies will come about as individuals compare their own criteria with those of others and as organizaions compare their performance with the performance of other comparable organizations. When serious discrepancies are noted through comparing such factors as application rates, average SAT scores of entering students, and the like, the organization is triggered to engage in a search for innovations. Although some innovations do result from accidental encounters with opportunity, the absence of significant environmental change implies only moderate periodic effort to innovate. Environmental stress, however, is a peculiar matter. It must be neither too great or too little. If solving a problem comes too easy, apathy results. If a solution proves too difficult, frustration or desperation results.

This line of argument suggests that stimuli to innovation are external and that the innovative process is not programmed. However, organizations can themselves stimulate innovation, either by explicitly changing levels of expectations, or by formally organizing individuals or a unit to engage in innovations or the stimulation of innovations. The degree of innovation produced by these internal mechanisms can be modified through creating explicit time pressure or through greatly clarifying and specifying goals. It is easier to reward or penalize for failure or success in meeting a specified deadline or accomplishing a task with a clear definition. Organizations spend most of their time on daily routine, and this activity tends to divert individuals from highly unprogrammed tasks involved in innovation. This phenomenon can be deflected either by specifying goals, establishing deadlines, or allocating resources to goals requiring nonprogrammed activity while at the same time prohibiting use of those resources for routine activities. When resources are specifically allocated for innovative program

development there is usually an immediate spurt of enthusiasm and work effort. A foundation grant to study values results in much discussion of values and how to affect them. When this activity produces significant changes they tend to be incorporated into routine activities but are rarely re-examined later. An illustration is the considerable enthusiasm with which a cadre of planners build a new academic institution and introduce many presumable innovative elements. When the initial enthusiasm wanes, however, those elements are rarely re-examined, except in the presence of external stress.

Important to contriving innovation is the availability of slack resources, i.e., resources not needed to maintain ongoing programs. Given the availability, organizations tend to look to predictable places for innovative ideas. Harvard, for instance, would see what Yale did. Organizations tend to borrow rather than invent, so that rate and type of innovation will be a function of exposure. The more contact members of one organization have with other relevant organizations the greater the rate of innovation. Once a well-recognized organization finds an acceptable solution to a generally experienced problem, the innovation will spread rapidly to other organizations within the industry. "General Education in a Free Society" published by Harvard produced a spate of new general education programs throughout the country. It is this phenomenon that accounts for so much of the imitative curricular planning in American colleges and universities. One institution develops a program of black studies to cope with the increased number of black students, and the innovation spreads to all other institutions experiencing a similar rise in enrollment.

When a total organization becomes aware of a problem, sub-units will search their memories for possible solutions. For the most part these subordinate searches will become ends in themselves. Rarely are there mechanisms for aggregating proposed sub-solutions into some rationally defined total solution applicable to the entire organization. However, this process operates differently according to whether an organization is a federated one or a composite one. A federated organization (of which the university is a prime example) allows each of the sub-units almost complete autonomy, whereas the composite organization is like a mosaic in which the meaning of any sub-unit is achieved by being an integral part of the total organization. Generally it is more difficult to achieve an aggregate organizational solution in a federal organization than in a composite one. Thus it is extremely difficult for colleges and universities to adopt any major change that modifies the roles of all subdivisions. Recent self-studies in large universities rarely have produced large-scale and lasting changes.

Whether organizations are federal or composite there still will be differences of sensitivity to innovations according to levels within the hierarchy. Central administration is sensitive to broad innovations, whereas members of departments or divisions can act almost obliviously to those needs as their members concentrate on their own operational goals. The president of the university may want the institution to make a leap toward greatness, but the chairman of the classics department is concerned with a tenured appointment for a well-liked assistant professor. A particularly vexing issue is whether planning for innovation is best carried on by administratively responsible operating units or by units having only minimal administrative duties, but presumably greater time and resources.

Three major strategies for producing organizational change are empirical-rational, normative-re-educative, and the application of power (Chin and Beene 1969, pp. 32-57). Empirical-rational strategies assume that people are guided by reason and will use that reason to serve their own self-interests. Regardless of whether this be true, empirical-rational strategies are probably most frequently used to bring about changes in organizations and indeed in the entire society in the United States and Western Europe. One subcategory of these empirical-rational strategies is the conduct of basic research to uncover potential answers and the dissemination of this knowledge through broadly applicable educational efforts. Within organizations where needed changes do not occur in this way, another rational mode is to replace personnel with those who will be more sympathetic to proposed changes. Although critics say formal bureaucracies frequently resist change, nevertheless the bureaucratic hierarchical organizational structure is specifically designed to facilitate change. Bureaucracies increasingly employ systems analysts as staff and consultants to make the bureaucracy more open to change. Clearly

derivative of this is the attempt to link applied research with the practices of people actually conducting the organization's business. An example is the development in the 1960s of research and development centers concerned with disseminating their educational results to practitioners. It is assumed that if practitioners are informed of favorable results of an experiment, they will willingly change their practice.

Colleges and universities have acted as though this were the major way to bring about changes. They have created offices of institutional research to produce evidence and have set up centers to improve instruction in accordance with that evidence. They have developed systems of performance evaluation that include student opinions, judgments of peers and the like on the assumption that if faculty members know how to change, they will.

However, before individuals can change their practices, they themselves may need to change. This fact leads to a second broad category of producing change--normative-re-educative strategies. Peoples' cognitive as well as affective traits may need modification. One technique is to help people improve their problem-solving abilities, so they will be able to detect problems more quickly and solve them more precisely. However, before problem-solving ability can be improved, other changes in human personality may be needed. To undertake change people must be quite open and unthreatened, and there are a number of approaches to help people reach this psychological state. Extended workshops and retreats can creat such an environment; away from campus, some re-education takes place almost without awareness.

The last broad strategy for planned change is the power-coercive approach, which assumes that someone's will must be imposed on those who should change. The ways power can be used to produce change are many, as exemplfied by three specific devices. The first includes strategies of non-violence that may divide the opposition through moral coercion or economic sanctions or both. Second, legitimate political institutions can be employed to produce change as in the case when the sanction of an academic senate is sought to give legitimacy to a new practice. Third, changes can be brought about through the composition and manipulation of power elites and the contrivance of different systems of alliances.

Although folk wisdom suggests that power-coercive techniques are not effective in collegial institutions, in actuality they are employed frequently. A dean will seek the support of many different individuals or constitutencies before asking the full faculty for a decision--a clear political tactic. A wise president will consult frequently with the prevailing oligarchy in the expectation that its members can bring along their own followers. And direct fear can be used, as when a provost rejects all recommendations for promotion, tenure or salary change until the school or department makes certain stipulated changes.

Such a conception of how an organization functions implies that innovation and change take place reluctantly. However, Cohen and March (1974) see innovation taking place in an almost irrational way in educational organizations. They conceive of the university as an organized anarchy that is unsure of its goals and lacking in appropriate technology, with no good means to evaluate its efforts. Change, when it does take place, is usually small and unrelated to any logical issue or problem.

Even though organizations tend to resist change for internal reasons, there are still enough examples to suggest some of the correlations or conditions for change. The conditions clearly are not causal, but theorists agree that the absence of enough favorable conditions can block an attempted change. Generally, highly complex organizations produce more ideas for change than do simpler forms. The variety of roles limits constraints and encourages freedom to experiment. Within a complex institution there should be enough decentralization of authority to encourage freedom to experiment but enough centralization to make reaching consensus possible. Obviously, personal relationships within an organization affect ability to innovate, with a warm and supportive relationship needed as individuals deal with new and sometimes radical ideas.

Havelock (1969) reinforces these observations with a more elaborate set of factors facilitative of innovation which were derived from several thousand studies.

The first factor is linkage--the extent to which mutual communicative relations exist among two or more parties. In general the more and stronger the linkages, the greater the exchange and use of information. Linkages, both formal and informal, should exist for the resource system, for the user, for the message, and for the medium. Resource systems linked with each other generate energy levels considerably greater than the simple sum of energy available to each resource system. Similarly, users of such systems need to be linked together--innovators linked to opinion leaders, linked to followers who can disseminate new ideas to all portions of the organization, whether it be a small business or a community. A supportive president needs close ties to the prevailing oligarchy, and a potential innovator should have linkages with both. Linkage also is significant for the message, because different messages properly linked become complimentary. Linkage of various pieces of scientific knowledge produces a new and stronger base upon which new knowledge can be developed. Linkage mediums are essential as illustrated by the period during 1973-74 when the public was kept aware and interested in Watergate hearings, in part because of linkages between television and newspapers. It may well be that the Carnegie Commission on Higher Education will ultimately have more influence than the Task Force on Education (1971) because of the linkages between the Commission's vast publishing venture and the daily and professional press.

The second condition is structure--a coherent framework that designates a rational sequence of steps, compartmentalization, coordination, and division of labor toward stipulated goals. The resource system needs to be structured to insure a division of labor, a coherent view of the client system, and planning of coherent strategies. Even though there is impressive evidence concerning the effectiveness of an innovation, the innovation will remain ineffective if the resource system does not have a structure that can assimilate it. Users, in turn, should be organized to receive information, just as the resource system is organized to send it. Where the user is an organization, the leader-follower structure must be effective to enable significant receipt of new information. The knowledge received should be in a coherent or structured form facilitated by an organized, carefully contrived medium.

Structure emerges as a particularly significant element in successful innovations in collegiate institutions. At the University of Washington a technically sound simulation planning office failed largely because it did not have access to the formal administrative structure. Programs of general education at the University of Illinois and University of Minnesota did not last long nor affect many students because they were only appendages to established structures. In contrast, a program lasted 30 years at Michigan State because a formal, recognized structure was created to maintain it. A program of student evaluation of teaching floundered at the University of Rochester as long as the student body was solely responsible for it. It became viable when the administration created and staffed a formal office.

A third condition is openness--the readiness to give and receive new information. Closed systems and closed minds are by definition incapable of receiving new messages. For the resource system, openness means a willingness to help and a willingness to listen. Openness on the part of a user is an active reaching-out for new ideas, new ways of doing things, together with serious efforts to adapt new ideas to one's own situation. The message itself should be open in the sense that it is adjustable and adaptable to special circumstances. Potential users should be able to try out and sample an innovation prior to an all-out commitment. Similarly, the medium should be open in the sense of being flexible and allowing for alteration to accommodate unforeseen circumstances and unanticipated user reactions.

The fourth factor--capacity--involves in a highly intercorrelated way wealth, power, status, education, intelligence, and sophistication. Generally speaking, the more power, prestige, and capital possessed by a resource system, the more effectively it will be able to use innovations. A system with massive resources is likely to produce more lasting innovations than a system with limited resources. Users also need capacity, which includes self-confidence as well as available time, energy, education, and sophistication. The concept of user capacity suggests a quality that is unfairly distributed in nearly all societies. Those most able to use an innovation have high capacity, although the low capacity individual needs the innovation most. Invisible colleges need to innovate to survive, yet lack the capacity to create new and innovative programs. The power and the

attractiveness of the message also is significant. Whether an innovation be colored television, the program of the physical science study committee, or the use of jet aircraft, a highly endowed message about innovation is most likely able to produce results. The medium also requires high capacity--the ability to store and convey large quantities of information.

The fifth factor is reward or reinforcement. Resource systems, whether they be commercial knowledge producers, colleges and universities, or college professors, require some variant of profitability, whether the profit be financial, recognition, or simply a satisfied client. For the user, profitability is equally important. An individual must receive advantage from accepting an innovation. As shall be shown subsequently, one reason college professors are reluctant to give up the lecture system is because they perceive no relative personal advantage from different modes of instruction. The reward value of a message is extremely important, and the perceived probability of reward is even more important. The innovation holding out the greatest possibility of reward will generally receive highest priority, and the value of the message will be heightened if the medium has value characteristics as, for example, publication of an article in a well-respected journal.

Factor six is proximity, illustrated by the phenomenon that people who encounter each other frequently tend to learn from one another. Effective resource systems have easy access to other resource systems. Proximity may be psychological or geographical. The proximity of users to the resource system is an obvious phenomenon, but the proximity of users to one another is also important because it reveals common interests and needs. Proximity of the message assumes familiarity to the user and the relatedness with user needs. The same phenomenon operates with respect to the medium.

A seventh factor is synergy--forces exerted together or in combination or upon the same point. Several inputs of knowledge working together over time produce a behavior identified as knowledge utilization. Synergy implies redundancy, but it is a purposeful redundancy. A variety of messages pertaining to the same piece of information are deliberately sent. Successful use of innovation by the resource system requires leadership that constantly exhorts the values of the innovation. Similarly, users need to be shown intensively over time the values of the innovation they are asked to accept. Effective messages thus have a built-in redundancy that the medium should allow for.

In addition to these seven factors, a few other factors are related to acceptance or rejection of innovation. One of these, familiarily, is a type of psychological proximity. Here a balance must be struck. If a message is too familiar-sounding it may not be perceived as something new, and not accepted. On the other hand, if the message is too strange it could be rejected as inappropriate to the needs of the user. Another factor is primacy, or being first. What comes first always seems to have a powerful force, which can be overcome only by definite contrivance. Status is also important; when someone or something is perceived as higher in social importance, legitimacy, or social power, it is likely to be given more attention. This does not mean that status always operates in the same fashion. Ambiquity of status may equate with high status. Resource persons, as marginal individuals with no definite status, may be the most effective innovators. The last condition involves values. Shared values will bring resource systems and users together, while different values will drive them apart. Users and resource systems may hold quite different sets of values on some matters, but it is necessary that there be a community of values germane to the suggested innovation.

As examples of the above factors, aptitude testing for college admissions in the form of the Scholastic Aptitude Test (SAT) spread west during the late 1950s to ration space in colleges and universities, in part because the SAT was generally a familiar and respected device. Another valid technique for rationing, random selection, was rejected because it was unfamiliar and threatening to the rationality of academic beliefs. (However, given the considerable self-selection of applicants to college, a random device would likely not produce a drop in student abilit[illegible]evels in any but a few institutions.) Another rationing device, the American College Te[illegible]ng Program, had to mount major public relations programs to compete with the College Extrance Examination Board, partly because the Board college admissions program was there first and partly because of the prestige associated with the Board and its eastern seaboard member institutions.

Another set of elements needed for innovation can be drawn from observations and conclusions about the nature and behavior of complex organizations:

Expectations and Performance
Threat
Social Pressures
Institutional Proximity
Institutional Complexity
Centralization
Formalization
Slack Resources
Capacity
Openness

EXPECTATIONS AND PERFORMANCE

In general, if the achievements of an institution are in balance with its expectations, there will be little reason for people to attempt to change their organization. It is when there is widely perceived discrepancy between achievement and expectation that conditions develop conducive to innovation and change. Wide perception is highly significant because frequently one segment of an institution may perceive a discrepancy which is not so perceived by other important segments. Administrators looking at an institution in a broad context are more likely to detect discrepancy than are individual faculty members concerned with their own idiosyncratic activities. The faculty in administration in the School of Education at Stanford moved to re-examine the curriculum although there was no deterioration of enrollment, nor was there persuasive effort by the university central administration or the dean to point out discrepancies between achievement and expectations. Rather, the expectations were formulated by individual faculty members. The discrepancies became apparent through their own feelings of unease, feelings that were reinforced by increasingly frequent criticisms of the program by students. The converse was illustrated in the abortive curricular change at Hamline University, with the newly appointed dean desiring to make a curricular change while the faculty saw no significant discrepancy between what they were doing and what they realistically could be expected to do.

THREAT

A somewhat threatening external environment is frequently an essential condition to reveal such discrepancies. If a college or university interacts with its environment in a balanced and harmonious way, most members of the institution will perceive no reason for changing. A threat from the external environment can disrupt the homeostasis of an organization and when sufficiently severe can force members to attempt to restore balance.

In the 19th century colleges finally had to make major changes in the curriculum and how they dealt with students because of the serious decline in student enrollments. Institutions were again forced to change when the entire society was threatened by the technological achievement of Russia in launching the Sputnik. Clearly, some of the curricular changes in the 1960s were produced by a dissatisfied larger society, as manifested in student disruption. In the 1970s a deteriorating financial base is forcing institutions to re-examine their curricula, their staffing policies, their management systems, and their relationships with sources of financing. More specialized innovations illustrate the same point. Public dissatisfaction with the quality of public school teaching forces schools of education to revise their programs. A shortage of college teachers forces institutions to tailor their programs to faculty, rather than to student desires. An externally forced merger of two adjacent institutions forces faculty and administration to attempt new programs, new methods of financing, and new modes of organization and administration. Perhaps one of the major innovations in all of American higher education during the 1960s was the evolution of public institutions into statewide systems. This development, suspect by faculty and administration, was literally forced by public demands for access to higher education and for economical operation of publicly supported institutions.

SOCIAL PRESSURES

Broad social, political, and economic forces in the total society produce a changing external environment, although the precise mechanisms and timing are difficult to establish. Thus it seems accurate to contend that the evolution of the utilitarian university in the last part of the 19th century was directly related to accumulation of wealth by individuals and by states, and to the intellectual impact of the scientific and technological revolution.

In a 1967 survey of institutional expectations of the future of graduate and professional education, chief academic officers and graduate deans listed the demands of the larger society as the most potent pressure for growth in graduate and professional education. Need for trained manpower, population pressures, and broad social demands were the three most frequently mentioned forces. In one way or another most institutions planning new doctoral programs indicated that they hoped to produce their share of leaders for the future. Yale and Princeton, for example, planned new developments in professional education on the ground that educational leadership was becoming increasingly important to society's future. The University of Maine anticipated increases and improvement of doctoral work in chemistry and chemical engineering because of the positive significance of the pulp and paper industry in the state and the negative significance of the air pollution that those industries produced. Ph.D.s in the life sciences and basic medical science were needed just to staff the enormous research effort required by people to whom health and medical care has been important and possible.

Social and economic pressures can serve to abort attempted innovations. During the late 1960s and early 1970s considerable interest in shortening bachelor degree programs developed as an economic move by institutions. However, three-year bachelors degree programs have not proven popular, in large measure because the overriding social need is to keep young people off the labor market for longer periods rather than to move them quickly into that market. But social and economic pressures also can produce innovations, as for example affirmative action and women's studies during the 1970s.

INSTITUTIONAL PROXIMITY

Most innovations are borrowed or imitated rather than invented. The amount and intensity of innovative activity in one institution is related to the proximity, either physical or ideological, of that campus to another campus. If institutions are geographically or ideologically close to each other and if channels of communication are reasonably clear, a great deal of borrowing of new ideas, practices, or artifacts will occur. One would expect the institution in a geographic area, for example, the San Francisco Bay Area, or the greater Boston area, to be attempting similar kinds of innovations, such as cooperative work-study programs initiated by Northeastern University or programs for Chicanos like the one at San Francisco State. Similarly, one would expect institutions which tend to identify with each other as, for example, the prestige private research universities or the church-related colleges, to be attempting similar kinds of innovations. Further, one would expect institutions in a geographic or ideological cul-de-sac to reflect few innovations and to be imitated by few other institutions.

The significance of geographic isolation is more difficult to establish, especially since some of the institutions most fertile in educational innovation have been located in geographically remote places: Goddard College in Plainfield, Vermont; Antioch College in Yellow Springs, Ohio; and Stephens College in Columbia, Missouri. In each of these institutions, however, the geographic remoteness was compensated for by strong ideological connections among institutions.

INSTITUTIONAL COMPLEXITY

Institutional complexity is determined by the number of different occupational specialties in an organization and the degree of their professionalism. In highly complex colleges and universities there is an enormous range of specialization, coupled with an incapacity of supervisors of large sub-units to understand or control the highly professionalized specialists. This provides a great deal of freedom for individual

professors to experiment and innovate, and it appears that many more experiments and innovations are initiated in large, complex institutions than in smaller, more specialized ones. However, complexity also means that no centralized authority is sufficiently powerful to facilitate adoption and institutionalization of innovative attempts. Hence, the rate of adoption in complex institutions appears to be much lower than in small institutions. Self-studies in large, complex institutions produce many innovative recommendations, most of which are not adopted because there is no means for obtaining the needed consensus. In large departments, such as the Department of Economics at the University of Wisconsin, there is a great deal of specialization and professionalization of faculty members as each pursues self-interests. Such a department may generate a number of different approaches to the teaching of economics. But the fact that one professor developed a truly effective new approach is no assurance that other members in the department will adopt the new procedures, even if there were persuasive evidence that the new approach was a superior one.

CENTRALIZATION

A related factor is the degree of centralization of authority and decision-making in an organization. In general, evidence from many organizations suggests that the more centralized an organization's authority, the less innovative it will be. A strict emphasis on hierarchy of authority limits what individuals will attempt and report. The evidence from institutions of higher education is not as compelling on this matter if the extremes are ignored. In institutions where the president occupies an authoritarian role, such as isolated church-related colleges, the amount of experimentation is minor. However, in institutions where a great deal of educational innovation is attempted, there also is considerable centralization of authority, even though that authority is exercised in covert or concealed ways.

The most creative periods of such experimenting colleges as Goddard, Swarthmore, Reed, Antioch, and Stephens involved considerable authority centralized in the hands of strong and typically charismatic presidents. More recently, two state universities, Michigan and Southern Illinois, have been innovative and productive in many areas, while possessing a high degree of centralization exercised by strong presidents. It may be that these strong presidents were able to contrive a great deal of decentralization to stimulate invention, reserving the exercise of their power to facilitate implementation. It increasingly seems plausible that centralization will have different effects at different stages of the innovative process. At the point of implementation, adoption and institutionalization it seems that a considerable degree of centralization is needed in order to fashion the necessary consensus to produce general acceptance of a new process or practice.

FORMALIZATION

Formalization is the emphasis placed on following specific rules and procedures in performing one's job. The evidence from other kinds of organizations suggests that high formalization is negatively related to innovation, because following procedures limits the range of experimentation an individual feels free to undertake. But once again the experience from higher education seems somewhat mixed. Generally, agencies and individuals professionally concerned with reform have urged the preparation of faculty handbooks and guides for counseling, guidance, and instruction. Such formalized materials are seen by some as an essential ingredient in the innovative atmosphere. The matter is complicated by the fact that from the 1960s onward increasing innovation has been attempted in many institutions while at the same time constitutionalism (a reduction of policies and procedures to written by-laws, constitutions, and statements of process) has increased. If formalization were clearly antithetical to innovation, institutions that developed structured statements of faculty responsibility, such as Stanford and Harvard, would witness a decline in the innovative spirit. This has not happened. Much of the reasoning for structured management information systems is to force decision-makers to examine more alternatives, thus opening up the possibility for innovative solutions. As was true of centralization and complexity, it seems that low formalization might be appropriate at certain points during the initiation of innovation, but that a higher degree of formalization might be desirable during implementation.

SLACK RESOURCES

An essential ingredient for innovation is the availability of slack resources that can facilitate experimentation and change. Slack resources are those that are not fully consumed by the routine operation of the institution. In collegiate institutions such resources are difficult to come by because all funds are traditionally spent for operation. Higher education institutions do not budget for innovative purposes. As was indicated earlier, academic budgets leave few discretionary funds available once payment for contracted personal services and physical plant maintenance has been made. In recent decades various external agencies have contributed the slack resources to stimulate innovation. However, this does not seem to have been sufficient. Usually, innovations are pursued only so long as external funding is available. Institutions have been unwilling or unable to redeploy their own resources to continue significant innovations to the point where they become accepted. The matter of slack resources becomes especially complicated during times of serious economic constraints, and a destructive cycle is created. Innovations are needed to respond to external threats of reduced financial support. Extra financial support is needed to contrive innovations. But the issue facing administrators is to find funds in the established operation to provide the needed slack resources in sufficient quantity.

CAPACITY

Slack resources are related to capacity--which involves such matters as wealth, power, status, intelligence, and sophistication. Generally speaking, the more power, prestige, and capital possessed by an institution, the more likely it will be able to sponsor innovations and to use the results if they prove workable. With considerable capacity, an innovation can be given high visibility, advertised well, and made to seem desirable. With high capacity, the full limits of an innovation can be probed and exploited for institutional purposes. With great capacity, the institution can use the needed sanctions to co-opt technically competent individuals to spend their time on a particular innovation. This concept can be illustrated with several examples. In recent years a number of small institutions with serious enrollment and financial difficulties have come to believe that salvation might lie in the direction of better management information systems and more complex planning. Yet those institutions lack the capacity to develop such systems to the fullest or to exploit the system once established. Very likely that particular cluster of innovations is more sophisticated than weaker institutions need. Among recent institutional self-studies, "The Study of Education at Stanford University" (1969) was widely disseminated, both on campus and off in the form of attractive volumes containing recommendations and supporting arguments. That study was widely noted, in part because of the capacity of the institution to produce good-looking and widely-disseminated reports. The factor of capacity speaks directly to the condition of a large number of small institutions created for the most part since 1965, which operate on limited resources, but are dedicated to innovative educational undertakings. Although many of the ideas developed by such institutions seem engaging and attract support, the prognosis is not good, simply because the resource base is too inadequate for the complexities of expectations. If a small, threatened institution is to promote its own survival, it should try to develop greater capacity, size and complexity in order to become a vital and renewing institution. This option is not easily available, of course, yet Golden Gate University in San Francisco attempted the transition in the 1960s and succeeded. The thrust of growth was into a strong, vocationally-oriented curriculum. A newly constituted board of trustees and new president secured a vital linkage to an urban constituency and recruited high level, part-time instructors. The resultant increase in institutional capacity has established the school on a firmer basis.

OPENNESS

The next structural condition seems essential, but is extraordinarily difficult to define. Openness is the degree to which an institution and its members are able to receive stimulus from external sources and react to them in creative ways. Openness is probably a product of the kinds of people working in the institution and the degree of complacency or defensiveness with which they view themselves and their institution. Highly academically pretentious institutions tend to function as ivory towers, remaining

quite insensitive to external pressures. Some institutions, such as those related to evangelical protestant churches, may be defensive and fearful of external intrusions. Openness implies the ability to undertake considerable self-scrutiny and criticism and the willingness to seek outside for possible new ideas that could bring performance and expectation into balance at continuously higher levels.

SECTION 5. TECHNIQUES FOR PROMOTING CHANGE AND INNOVATION

Innovation does not simply happen, even though the conditions and elements for successful change are present. Those who are concerned must employ various techniques to encourage people to experiment and accept change. Experience has produced some basis for judging adequate techniques. For the most part, evidence on the effectiveness of techniques consists of testimony of those involved or observation of changing practice that allow inference on the relationship between the changed technique and the actual innovation.

Perhaps the most prevalent techniques, especially in small to medium-sized institutions, are conferences and workshops designed to stimulate thinking about a problem area and to allow time for individuals to create solutions. A typical conference concerned with innovation and change is the Fall Faculty Conference held on many campuses just before the beginning of fall term. These can vary from one day to a full week. The format consists of one or several outside speakers whose concerns are relevant to the interests of the institution, together with an address on the state of the college by the president. Administrative sub-units are allowed time to plan the year's activity. There is also enough leisure so that individual faculty members can make final their own plans for the academic year. In one systematic study of faculty development procedures, 90% of the college deans surveyed rated Fall Conference as of more than limited value (Miller and Wilson 1963, p. 36). The author's experience from having served as a speaker or resource person for several hundred of these conferences suggests that they can be momentarily satisfying and generate considerable enthusiasm. On one campus the theme is comprehensive evaluation of a new curriculum, and the faculty leave with firm intent to evaluate systematically. At another campus, the theme may be inaugurating a year-long program of curricular revision which again produces high enthusiasm. However, unless the conference is specifically linked to a more complex process of action, enthusiasm wanes quickly and not much happens. If a conference is an integral part of an elaborate self-study program designed to mark the achievement of one phase and to make plans for the next, the odds for producing definite decisions are somewhat greater. If a definite structure is provided so that the ideas presented in the informational sessions are made operational in division or departmental meetings, again, the odds for success go up.

Workshops may be either institutional or inter-institutional in character. A workshop program at Stephens College has been a significant tool to keep the institution experimenting and innovating. Funds are budgeted each year as salaries of small groups of faculty to conduct summer workshops to develop new ideas for teaching, counseling, and curriculum development. Findlay College in Ohio has used periodic workshops to help the college compete with other institutions. One workshop was a three-day effort held after Fall term. Each department was expected to generate new courses and programs consistent with the emerging trends of higher education described by a visiting resource person. Some institutions have found that conducting workshops on campus is not completely satisfactory, because participants are so accessible to other demands on their time. However, whether transporting an entire faculty off campus is worth the additional cost is highly conjectural.

The format in inter-institutional workshops is for each institution to designate one individual or a small group of individuals to attend, with a personal or institutional concern in mind. The attendee works on a solution during conversations with people from other institutions and resource people. These workshops will last from several days to six weeks. However, the experience of Danforth Foundation and the North Central Association Study of Liberal Arts Education suggests that somewhere between two and three weeks is optimal. There must be time for the workshop participants to develop some group cohesiveness and to explore fundamental issues without undue defensiveness, and there must be time for members of the same faculty to get to know one another and to decide what their real problems are. However, the workshop must be short enough so that fatigue does

not set in with the attendant drop in morale. Well-organized workshops involving appropriate resource people, optimum amounts of time, and a harmonious mix of participants have in the past led to significant developments. Participants from one institution developed the specifications for a newly created position of dean of undergraduate studies, as well as the political strategies to gain faculty acceptance of the idea and to tolerate the appointment. A pair of men's colleges located near each other developed plans for a coordinate women's college that would coordinate with both institutions. The workshop provided an opportunity to explore the implications of involving women in the two institutions. The final result was that one institution became coeducational and the other created a coordinated women's college adjacent to it. Still another faculty team developed a detailed, revised program in general education, as well as strategies needed to gain adoption. The result was that the institution adoptd the scheme almost unanimously within five months of the workshop.

Several factors seem to be needed if workshops are to be successful. If it is a team endeavor, it should include members of the institution oligarchy and an administrator sufficiently high in the institutional hierarchy to insure that whatever is developed is backed by the power elements on the home campus. If an institution-wide problem is undertaken, there should be representation of the academic departments that will be most directly affected, and there should be clear agreement by the participants as to who is the team leader. Leaderless teams and teams torn by dissension prove ineffective for the most part. The morale on the home campus of a participating team should be reasonably high because a team does represent in microcosm the home campus. Several less successful workshops have involved teams from institutions torn by administrative and internal turmoil. When functioning at optimum levels, workshops provide inspiration, new knowledge, time for reflection and testing ideas, and opportunities to work in a reasonably focused manner on a problem of personal concern. Workshops in addition need to provide some kind of tangible payoff, which can be extra remuneration or an opportunity to combine work and vacation in interesting places.

Clearly, the values of the workshop require the interest and support of key leaders of the home institution. A successful technique is for the president of the institution to visit the scene of the workshop for several days, in order to understand what the team is doing and to give the team evidence of presidential encouragement and support. Very likely, the progress of the workshop-spawned project should be monitored once the individual or team has returned to the home campus. The North Central Association Workshop, for example, sent visitors to each campus during the subsequent academic year to hear what progress had been made. The fact that someone was coming to visit stimulated faculty members to update their thinking and discover what progress had been made. Financing also seems to be important. The Danforth Foundation, which spends approximately $1,300 per participant, is one of the more effective examples. Underfunded workshops may succeed but underfunding does not allow participants the richness of program or the provision of payoff that seem essential. In the Stanford School of Education Planning Workshop, a key ingredient was enough funding so that summer salaries could be paid to the participant faculty members.

Consultants are facilitators of change and again the evidence of their effectiveness is largely anecdotal and somewhat mixed. Outside consultants are brought to campuses for many purposes. They may be nationally recognized individuals whose thoughts on institutional concerns may assign a patina to them. They may be experts who can help with a specific problem. They may be individuals whose views coincide with those of a principal administrative officer or a faculty group. A consultant can suggest actions with much less threat than can the local individual or group. Or the consultant can be brought in simply to acquaint a faculty with major developments in higher education. Consultants may be invited for a one-time appearance or may be engaged for a series of visits to ensure continuity: The one-time consultant probably is of most value to disseminate information, to motivate, or to assign legitimacy to some development on the campus. One visit does not allow the monitoring or reinforcing to insure implementation of ideas.

Probably of more value than a single-visit consultant, the continuing consultant can serve as a sociological stranger who is a part of the institution, yet apart from it. During periodic visits the consultant can present fresh viewpoints while at the same time motivating people on the campus to continue the experiments, innovations, or projects they had agreed to work on. One of the early exemplars of this role was W. W. Charters, who

became the part-time Director of Research at Stephens College, Columbia, Missouri. His main position was first Dean of Education at the University of Illinois, and then Director of Research at the Ohio State University. With national prestige, his thoughts on education were valued. He would visit Stephens College several times each year for several weeks at each visit. While on campus he would talk with many people about their concerns and would stimulate them to experiment with ideas that had occurred to them. A typical scenario would have Charters taking notes as he and a faculty member talked. Toward the end of the interview, he would remark that the faculty member had the rudiments of an interesting experiment, and should feel encouraged to try it out. If the ideas required modest financial assistance, Charters assured that it would be forthcoming. On his next visit Charters would make a point of revisiting the faculty member to inquire about progress and to offer suggestions for further development. Because of his easy-going temperment, he was able to relate well with all faculty members, and because he was faithful with respect to confidentiality, people would talk with him about fundamental, personal, and professional concerns. The value of a part-time consultant for institutions is revealed by subsequent history at the college. When Charters retired, the institution hired a vigorous and mathematically-oriented Director of Research as a full-time employee. He immediately attempted to accelerate the amount of experimentation to the point that the campus was in a constant frenzy of activity. In addition, he had aspirations of power and used the role of Director of Research to aggrandize himself. Within several years his activities had brought the concept of the Director of Research as a change agent into disrepute and he finally had to leave the institution. During the next five years the administration of the college allowed the role to lie dormant and then appointed another Director of Research on a part-time basis expecting him to recreate the role in the Charters-sociological-stranger-mold. Charters held the role for 25 years and his eventual successor held the role for seventeen years.

The availability of discretionary funds for relatively small grants to faculty members to experiment appears to be an important force for innovation, although once again evidence must be largely anecdotal and testimonial. The Center at the University of Michigan has long maintained a Wolverine Fund and the Director of the Center believes that administering that Fund is one of his most valuable responsibilities. By providing just a small amount of money he can enable a faculty member to try something new and, if it works, to bring about a change in practice. Michigan State University, with Ford Foundation Support, has maintained a similar fund and periodically publishes booklets that describe several hundred innovations stimulated by judicious use of those funds. When the Metropolitan St. Louis Junior College District was created its first president obtained board approval to retain five percent of the total instructional budget to be used at the president's discretion to encourage new activities. In practice, the president retained two-and-one-half percent and allocated to each of the constituent three campuses a pro rata share of the other two-and-one-half percent. The presidential funds were assigned based on competitive faculty efforts to generate interesting and significant new ideas. The Exxon Foundation has periodically made small discretionary grants to presidents of institutions to be used in whatever manner the president wishes. Some evidence indicates that interesting projects resulted from the availability of the relatively small amounts, varying between $2,500 and $7,500. But whether these innovative funds produce long-term or lasting change is extraordinarily difficult to determine. A report from the University of California suggests that sums granted to improve instruction are well spent but produce few lasting results. Small grants can enable persons to change something about their own teaching or courses. If those changes do not require sustaining funds or substantial extra work, they can become permanent. But there is always the danger that when temporary additional funding ends, behavior will regress back to the traditional.

It is an aphorism of the reforming literature that changes will not come about significantly until the reward structure is changed. The folk wisdom holds that individual rewards in higher education go for research, publication, and national recognition. So long as that remains true, professors will continue to function in their educational capacity as they have since the turn of the century. Such an aphorism covers a complex condition. First of all, in the vast majority of collegiate institutions, the stereotype reward structure does not exist. In all of the junior colleges, most of the liberal arts colleges, and a large proportion of the state colleges rewards such as promotion, tenure, and salary changes are based either on longevity or linked to the teaching or educational activities of the professoriate. Presumably then, those institutions would be especially encouraging of educational innovations and changes. Yet there is no persuasive evidence that faculty members in those kinds of institutions are

any more or less interested in change than are faculty members in the large research-oriented universities. The student opinion evidence comparing junior colleges and universities seems to indicate that students view their junior college instructors and their university instructors about the same. Further, close observers of liberal arts colleges and state colleges perceive no massively different amounts of reforming activity. When one looks at major changes by faculty members, for example, accepting a new position, financial rewards do not appear to be critically important. "...Despite the impression given by much of their conversation that academics are obsessed with pay, it appears that in making job decisions it is not an important matter..." (McGee 1971, p. 142) Nonetheless, sanctions and rewards continue to loom large in the theory and examples of innovative behavior. Cartwright (1965), for instance, contends that most theories of social influence stress the significance of the ability of someone to exert influence through the possession or control of valued resources, and economic resources have consistently been high on the list of things valued.

A few overly-simplified examples make the same point. The Harvard Committee on a restudy of general education reached the conclusion that faculty members would not be willing to teach general education courses unless there were clear incentives, with a collapsed period between sabbatical leaves the most promising. The faculty of Michigan State University, University College, dedicated their professional lives to interdisciplinary activities, yet were rewarded comparably with respect to rank, pay and tenure with faculty members in the more traditional departments of arts and sciences. Professors asked to teach open-circuit television are rewarded by a reduction of teaching load to a single course, and some professors at Antioch College gave up a portion of their traditional role and were recognized by the institution's counting a third of their professional activity for salary purposes, even though it was expended in highly flexible and unusual ways.

Yet another technique for innovation is the use of literature and written communications. Most of the centers for the improvement of instruction publish newsletters telling of new developments. So do most of the higher education associations and organizations. There is also a growing volume of monographic work, research reports, and conference proceedings regarding higher education. In fact, there is so much printed material available that print channels of information are saturated. But the volume of material is only part of the problem. Much education literature is useless as information--being prolix, redundant, trivial, conservative, or deadly dull and the situation is much the same today. Wold (1963) reviewed the situation in 1963. "Both because they are so numerous and because they are often not well edited, the specialized publications generally appear to fail to reach their audiences effectively...There is much duplication in the publications of the education associations, a number of which have overlapping membership lists. The holder of multiple memberships must wade through essentially the same material over and over, to find the few unique items of information...Professional leaders, their desks littered with printed materials, need a means of finding relevant information quickly and systematically. No truly effective 'digest' publication now exists." (pp. 3, 4, 32)

It is true today that the CHRONICLE FOR HIGHER EDUCATION provides relatively rapid news coverage, as does CHANGE magazine. Yet CHANGE reaches an audience of only about 90,000 out of the 750,000 professors in the country, and the CHRONICLE appears more frequently on administrative desks than on desks of faculty members. Because of the remote likelihood of professors seeing things in publications mailed to them, literature conveyed by direct mailing does not seem to be an important device for stimulating experimentation or change. Some institutions have tried to rectify this matter by establishing reading rooms or by routinely circulating printed materials of educational worth. One gets the impression that such collections are not examined in the so-called faculty reading room and are examined only accidentally if a professor happens to be on someone's routing list. Because higher education is essentially a verbal field, with verbal professionals, the use of the printed word must be judged slightly effective as a stimulator of innovation, change, or reform.

Much of the preceding can be summarized by noting how developmental faculty members' practices and techniques are promoting change. Among the highly valued practices are sabbatical leaves at half salary or more, private offices for all faculty, financial assistance for attendance at professional meetings, adjustment in load for research and writing, financial assistance for further study, and less than normal load for first-year

faculty members. At the opposite end of the continuum stand faculty handbooks, collections of library materials on higher education, free college workshops for all faculty members, active faculty committees charged with improving instruction, visiting lecturers on higher education, and orientation sessions for new faculty members (Miller and Wilson 1963).

Institutional self-studies have been heralded by many, including this writer, as a major technique to bring about significant changes. Institutional self-studies are of two general sorts: (1) Those prepared for gaining or continuing accreditation, and (2) those generated by the institution for self-evaluation and improvement. Accreditation self-studies have tended to be lauditory of an institution in favorable light to accreditation agencies. The self-study has no such purpose, and hence could be more candid in calling for change. There are clear examples of institutional self-studies which have achieved such a goal. During the 1950s Stanford University conducted a self-study with Ford Foundation support which led the institution to attempt to move from strong regional stature to strong national stature. In 1960 Stephens College, Columbia, Missouri, conducted a self-study that resulted in a major shift from a two to a four-year institution--a shift accompanied by other major changes such as elimination of departments and the initiation of the Stephens House Plan. A self-study at Vanderbilt University in the early 1960s outlined a series of changes that occupied the institution during the rest of that decade. A self-study at Hofstra University resulted in the eventual implementation of a cluster college. However, more recent experience indicates that self-studies have not been as productive as supposed. Many self-studies produced long lists of recommendations, without significant change taking place. Or if changes did occur, they were brief and the institution soon reverted to traditional practices. Some institutions have grown so complex that there are simply no good mechanisms for implementing changes that a self-study has recommended.

Self-studies may still serve an important function in facilitating innovation, change, and reform. To be effective, a self-study should affect a large portion of the various constitutencies involved, including faculty, students, and administration. The work on the self-study should be done by both formal and information organizations. There should be a great deal of campus-wide communication regarding findings as they emerge, and there should be ample opportunity for protracted debate before final decisions are reached. When all of the data and various sorts of recommendations have been compiled, one individual should prepare the final report, usually the president or another person of stature.

For a self-study to have any chance of bringing about significant changes, it should have a definite time limit. Intensive work should consume not more than 18 months and preferably only 12 months. Groups making recommendations should be required to be fiscally responsible. A self-study should be headed by a steering or executive committee which has the power to reject recommendations and call for more realistic suggestions. Such a body should be served by a full-time and well-respected staff person who can facilitate the essential intercommittee communications and who can floor-manage recommendations through the legislative processes.

Another technique also open to some question is the presidential or chancellor's commission or task force to explore a particular matter, whether it be a revised campus judiciary or recommendations for a stable state economy. The commission, usually composed of significant individuals, has the advantage of being a relatively small group which reports directly to the chief executive. Because it acts in response to a specific question, its work can be accomplished quickly and recommendations drafted in consistent style. However, the commission technique has several weaknesses. Unless specific steps are taken, the commission's activities and findings are not widely shared. When the time for action comes, much of the commission's earlier debate must be redone. In addition, the commission is much more open to the charge of being an administration tool rather than an institution-wide endeavor. On campuses where there is considerable tension between administration and faculty, this fact alone may prove lethal to the adoption of any significant recommendation. The commission, being a smaller group, may tend to take an overly parochial view of its findings and recommendations. Its members may not be able to gauge attitudes and feelings of the many constituencies which will be ultimately affected by commission findings. There is an expectation that commission members can function without adequate assistance of a senior and respected staff member. A commission draft written by a temporary, part-time, or junior member of the faculty is almost bound to be

suspect. Unfortunately, some commissions appear to be simply a formal expression of presidential concern with no expectation of any serious results. To counter this appearance, the chief executive officer must have a clear mandate. The chairman of the commission and the staff support should be senior individuals of established reputations who can be presumed to have the best interests of the institutions in mind. The commission lets the full set of campus constituencies know what concerns the commission, what progress it is making, and what sorts of recommendations are likely to be made. There clearly should be opportunity for the various constituencies to react throughout the tenure of the commission.

A different device that came into existence in the early 1960s is the instructional development agencies that seek to influence and improve college teaching through three activities: Service, research, and teaching. These agencies may have as few as two or three professional staff members or as many as 65. They seek to encourage improvement of teaching by providing professional assistance, taking modest grants, disseminating information about teaching, conducting faculty evaluations and workshops, training teaching assistants, and helping faculty members develop new instructional materials. They fare best, of course, when the university climate is supportive.

Finally, the simple technique of detailed planning and organization is essential if innovative activities and experiments are to succeed. This sounds like a truism, yet it is remarkable how frequently this is violated. Almost invariably, successful innovative projects have been ones in which the directors were quite sure what the outcomes would be. They were projects in which definite time tables and goals were established and monitored. They were projects in which there had been accurate anticipation of the availability of needed technology. And they were projects in which the director made explicit agreements with all those involved.

A highly intriguing project at Purdue University was the development of a twelve-mini-course program for the improvement of college teaching that was used at four other midwestern institutions. Each course consisted of printed materials and cassette-recorded materials that faculty members could work through at their own rates. The materials were professionally done and made in sufficient numbers so that all involved had copies. Cooperation among the project directors and participating campuses was insured by specifically trained individuals who were paid a stipend and whose efforts were carefully monitored. While there were other contributing elements to success, such as technical competence of the directors, the key element still seemed to be planning and organization. Writers of the mini-courses were paid only after the completion of their work. A definite review process was worked out in advance to help edit materials. Coordinators of the project on other campuses were brought to the Purdue University campus for three days of training before being allowed to organize their own campuses. There was a clear differentiation between the development of materials and their research uses. Each activity was carefully designed and carried out with technical excellence. This can be contrasted with another project implemented in an almost lackadaisical manner by graduate students with only casual organization and guidance from the project director. Detailed planning and organization is consistent with the earlier observed need for some degree of formalization, although it may sound disturbing because specific planning and organization might tend to jeopardize flexibility and creativity. The point of view here, however, is that while there might be some such danger, the far greater danger is failure of an innovative effort or experiment because of lack of specific planning and organization.

These above techniques are not necessarily new suggestions. They have been recommended and tried for years. However, they are described in some detail because of their continued validity in the process of promoting innovation and change.

SECTION 6. A SUMMARY OF ELEMENTS OF SUCCESSFUL INNOVATION

While there is no good way to rank order the various elements of successful innovation, at least one order can be suggested.

1. Reasonable size
2. Reasonable complexity
3. Reasonable capacity or strength
4. Combined centralized authority with some decentralization
5. A formal structure combined with ways to modify the structure
6. Chief executives who perceive themselves to be leaders
7. An oligarchy concerned with change
8. Individuals viewing innovation as a rewarding activity
9. A general air of openness in the institution
10. A generally perceived discrepancy between expectation and performance
11. External pressures of significance to the institution
12. Departments that are recognized but constrained
13. Administration and faculty existing in creative tension
14. Generally agreed upon institutional purposes
15. A reasonably fresh faculty
16. An active institution but not hyperactive
17. Generally good personal relations
18. Devices to gauge social need
19. An innovation for which a relevant technology exists
20. Availability of people who are competent to use the needed technology
21. An innovation consistent with an institution's history and tradition
22. An innovation which, if adopted, provides rewards to those affected
23. A state of institutional readiness for that particular innovation
24. Evidence as to the utility of comparable innovations

Based on those elements a prototype of an institution where successful innovation is likely can be constructed and compared with a potentially non-innovative institution. It should be pointed out that the specifics such as institutional size are hypothetical and intended only to illustrate concretely the principles and postulates previously described. The following are hypothetical profiles of potentially innovative and non-innovative institutions with respect to widespread use of educational media or the adoption of any other category of educational innovation. These, for the sake of comparison, are both liberal arts colleges.

POTENTIALLY INNOVATIVE	POTENTIALLY NON-INNOVATIVE
1. 2000 FTE undergraduate enrollment	1. 800 FTE undergraduate enrollment
2. Divisional organization, plus a number of quasi-independent programs	2. Departmental organization with most departments one, two or three persons
3. 60% Ph.D. on faculty, five million dollar endowment, 250,000 volume library	3. 30% Ph.D. on faculty, non-endowment, half million dollar accumulated operating deficit, 100,000 volume library
4. President's right to set budgets, approve promotions and to appoint committees clearly recognized	4. Constant faculty resistance to exercise of president's power over budget, salaries, and promotions

5. Well-recognized channels of official communication, clear definition of administration duties, plus open door policy for administrative offices	5. Confused channels of communication and general uncertainty as to what office decides what matters
6. President who perceives himself as an educational leader	6. President who sees himself as subordinate to denominational authority
7. 25 professors, deans, and department heads perceived as having an important say and who trust and are trusted by the president	7. Faculty leaders in opposition to administrative leaders such as deans and division heads
8. 10 to 15 faculty members, bright, ambitious, somewhat iconoclastic, but who identify with the institution	8. Most faculty members content to teach their classes then turn to personal pursuits
9. Most people feel unthreatened and are willing to discuss even major changes	9. Older faculty and administrative staff who view earlier times as ideal
10. General awareness of major institutional strength as well as major weaknesses	10. General complacency except for salary levels and work loads
11. Growing competition from institutions judged as strong equals	11. Stable and generally satisfied body of potential students and their parents, thus insuring a steady and desirable enrollment.
12. Strong divisions that recognize differences between disciplines	12. Many small departments, jealous of threats to departmental enrollments
13. Faculty committees chaired by relevant administration and free exchange of information between committees and administrative offices	13. Faculty committees restricted to faculty with recommendations going straight through faculty channels to the president for for approval or veto
14. General belief and acceptance that the institution builds character, prepares teachers and prepares pre-medical, -law and -graduate students	14. Faculty concerned chiefly with pre-professional work and administration seeks to to offer many different vocational programs
15. Faculty and administration that work hard but do not feel overburdened and frenzied	15. Average faculty members serve on five active committees and average administrator on 15 committees and a general feeling of frenzy and many complaints about overwork
16. Generally one or two major institutional changes sought each year and encouragement but not pressure for individuals and sub-units to experiment and change	16. No major changes attempted in the last ten years or major curricular revisions attempted every two years

17. A pervasive feeling of friendliness	17. Many cliques and a general feeling of jealously and animosity
18. Competent office of institutional research and active and able advisory committees for all major programs	18. Each department is expected to discover needs or demands for changes and new programs
19. Director of the Media Center a Ph.D. in Psychology, who holds rank in an academic department	19. A part-time technologist in charge of media

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